COLOURED FIGURES OF MARINE PLANTS,

FOUND ON THE SOUTHERN COAST OF ENGLAND;
ILLUSTRATED WITH
DESCRIPTIONS AND OBSERVATIONS:
ACCOMPANIED WITH A FIGURE OF THE
ARABIS STRICTA
FROM ST. VINCENT's ROCK.
TO WHICH IS PREFIXED

AN INQUIRY

INTO THE MODE OF PROPAGATION PECULIAR TO SEA PLANTS.

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"——Cum rerum natura nunquam magis, quam in minimis tota fit." *Plin. Nat. Hiſt.*

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PLANTARUM MARITIMARUM

IN
ORIS ANGLIÆ AUSTRALIBUS SPONTE CRESCENTIUM,
ICONES PICTÆ;
DESCRIPTIONIBUS ET *OBSERVATIONIBUS*
ILLUSTRATÆ.
NECNON
ARABIS STRICTA,
DE
RUPE S. VINCENTII,
AD VIVUM COLORATA.
QUIBUS PRÆFIGITUR

DISQUISITIO

DE PLANTARUM MARITIMARUM PROPAGATIONE.

AUCTORE
T. VELLEY, Arm. D. C. L. &c.

"——Cum rerum natura nunquam magis, quam in minimis tota fit." *Plin. Nat. Hiſt.*

BATHONIÆ:
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Jos: Banks

AN INQUIRY INTO THE PROPAGATION OF SEA PLANTS.

IT is an object of regret that the marine plants, all of which are well deſerving our notice, either for the beauty or ſingularity of their ſtructure, ſhould have been leſs attended to, than the other branches of that extenſive claſs, under which Linneus has arranged all thoſe vegetable productions, which originate from latent ſources of propagation.[1]

If we except the hiſtory of the fucuſes written by Gmelin, who with much ingenuity and experimental knowledge, has endeavoured to elucidate the myſterious principle by which their propagation is effected; and the general obſervations of Gærtner on this head, with reſpect to the cryptogamous claſs; it may be difficult to point out the work from whence any material information is to be derived, reſpecting the Œconomy of Nature, in the origin and mode of increaſe peculiar to this numerous branch of the algas. For while we have cauſe to lament that the remarks which caſually occur upon this particular ſubject in the celebrated work of Baſter, are ſo very few, and confined only to two or three ſpecies; we may find as little reaſon to be ſatisfied with the ingenious, but ſpeculative and unfounded theory, which Reaumur has given us in the ACTA GALLICA, upon the floreſcence of the fucus.

It muſt be allowed that the deſcriptions, which we ſometimes meet with in various botanical works, with reſpect to the fructification of the marine plants, appear rather to be founded on the analogy[2] ſuppoſed to exiſt between vegetables in general, than on any actual obſervations reſulting from a ſeries of experimental diſcoveries. To this it may be added that much information cannot reaſonably be expected from the curſory remarks of thoſe, who pay ſhort and caſual viſits to the ſea-ſhore: when the want of ſeaſonable opportunities to attend repeatedly to the gradual changes which theſe plants may undergo, muſt render doubtful the obſervations, and oftentimes fruſtrate the attempts of the moſt ingenious inveſtigators.

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[1] The illuſtrations, which had been firſt thrown upon the numerous tribe of Moſſes and Lichens, by the incomparable work of Dillenius, were inſtrumental in bringing to perfection the ſcientific diſcoveries of Hedwig. Theſe have been followed by the accurate reſearches of our indefatigable countryman Dickſon, which have greatly contributed to diffuſe a general knowledge of the above plants.—The Lichens, Sphærias, &c. have been explored by Hoffmann—The Britiſh Ferns, with their fructifications, by Bolton.—The variable tribe of Funguſes have furniſhed an ample field for the inveſtigating talents of Batſch, Bolton, Schæffer, Builliard, &c.

The works of all theſe authors abound with highly-finiſhed and characteriſtic figures delineated from Nature.

[2] This opinion ſeems to have been adopted by Wulfen, in his deſcription of the FUCUS corniculatus, which we meet with in the COLLECTANEA of Jacquin. "Veſiculas veras fœmineas hoc in fuco haud detexi: maſcula contra tubercula hemiſphæroidica, apice poro impreſſo umbilicata, et in foliorum lateribus . . . . . ſuo occurrere ſolent tempore." Collect. Vol. 1. p. 359.

See alſo F. concatenatus, and F. ſelaginoides, in the ſame Vol. p. 355—358.

We likewiſe find ſome of the confervas arranged under the diœcious claſs. For inſtance, CONFERVA polymorpha—C. plumoſa. (Fl. Scot. p. 990—996.) And in the ſame work, the C. nodulosa is referred, though not decidedly, to the monœcious claſs.

It ought not to be matter of ſurpriſe, that ſo ſmall a ſhare of information ſhould have been communicated to the Public, by Linneus, with reſpect to the extenſive genera of fucuſes and confervas.[3] It muſt rather excite our aſtoniſhment, that, in the immenſe Chaos of the vegetable World, which became harmonized and reduced to order by his arduous and unexampled aſſiduity; even the minuteſt parts ſhould have been brought forward, and ſeparated under ſuch judicious and well-adapted diſtinctions; that the progreſs of inveſtigation and arrangement, whatever theory may prevail as to the mode of propagation peculiar to each, muſt be unqueſtionably facilitated and promoted.

An appeal from any part of a ſyſtem, which from its diſtinguiſhed excellence has juſtly ſuperſeded all others, muſt appear under an unfavourable aſpect. Yet it is to be obſerved, that the principle itſelf on which Linneus has eſtabliſhed his ſyſtem, did not by any means appear clearly aſcertained to its illuſtrious author, as far as relates to that particular part of vegetable hiſtory which comes under our preſent conſideration: although from the definitions of the generic characters, which he has given of the ſea plants, as well as from data laid down in ſundry parts of his works, he ſhows how ſtrongly inclined he was to extend his hypotheſis, even to thoſe undefined parts of vegetation, which either from their extreme ſimplicity or minuteneſs, have vindicated the propriety of their being fixed under an anomalous arrangement, with reſpect to the ſexual ſyſtem.[a]

We may not probably find in the whole circle of Natural Hiſtory, a work more adapted to convey inſtruction, or which carries with it a fairer claim to preeminence, than the PHILOSOPHIA BOTANICA of this author: not merely as being the ground-work of the ſyſtem it is meant to eſtabliſh, or for the preciſion and beautiful mode of arrangement, which appears in every part of it; but as affording ſatisfactory proofs of the importance of that ſcience, which is ſo evidently calculated to diſplay the wonderful Œconomy of Creative Wiſdom. It may in ſome meaſure counterbalance the regret which muſt naturally ariſe in the inquiſitive mind, from the very ſuccinct and compendious manner in which this work is compriſed, to find that many of the moſt important aphoriſms contained in it, have given riſe to ſeveral intereſting and philoſophical diſquiſitions, publiſhed under the auſpices and approbation of Linneus himſelf, in a well-known work, entitled AMŒNITATES ACADEMICÆ. Among theſe, one tract in particular may be conſidered as a curious and ſatisfactory illuſtration of thoſe data on which the ſexual ſyſtem more immediately depends.[b] Here we find exemplified the protecting influence of Nature, adapted to all the varied exigencies of Her extenſive families. Among the inſtances of this admirable Œconomy, we do not meet with one more ſingularly impreſſive than that which occurs in the ſubmerſed aquatic plants. Several of theſe at the critical period of their floreſcence, and at no other time, are obſerved to emerge juſt above the ſurface of the water, that the fertilizing effluvia, unobſtructed in the lighter medium of the atmoſphere, may without interruption attain its deſtined ſtation: which end being accompliſhed, they ſoon after ſubſide. If in plants of this deſcription, produced in tranquil waters, ſuch extraordinary proviſion for the

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3 Mr. Hudſon, in his FLORA ANGLICA, has deſcribed a much greater number of marine plants, than Linneus has given us from all the various parts of the World. See Sp. Pl. Edit. 2da Holm.

[a] Claſs Cryptogamia.

[b] Sponſalia Plantarum.

propagation of their ſeveral ſpecies is found to be expedient; and, on the other hand, the powers of Nature, according to the doctrine laid down in the ſyſtem,[b] continue to act by general and unvarying laws: it muſt neceſſarily occaſion ſome difficulty to account for the propagation of that numerous tribe of plants, which though permanently fixed, and frequently at conſiderable depths in the ocean, find an element congenial to their mode of increaſe.

But here our inquiries are no longer ſupported by that analogy, which accompanies the known laws and progreſſive ſtate of vegetation. Upon the firſt examination of a marine plant, it muſt appear, that the compariſon, which has been made between the lacteal veſſels in animals, and the fibres of roots in terreſtrial plants, does not in any degree extend to the former. The roots of the fucus, ſo far from preparing and diſtributing the alimentary juices by abſorbent veſſels, ſeem by their durable and impervious texture, only calculated to ſecure to themſelves a ſtation. We find them attached to the ſmootheſt ſtones and other bodies, utterly incapable of affording any kind of nutrition. From the evident properties of their roots, as well as from their general ſtructure, theſe plants do not ſeem to poſſeſs a ſeries of veſſels, by which the fluids are propelled. It is true, this defect is in many ſpecies amply compenſated for, by numerous pores variouſly interſperſed throughout the ſurface of the frons. To aſcertain this fact, it has been ingeniouſly remarked, that if a dried ſpecimen be immerſed in water, it will ſoon acquire its former tone and ſtate: but if the experiment be only partially applied, then that part, which is kept free from moiſture, will continue arid and lifeleſs.—A concluſive argument, that the fucuſes, as far as the experiment has been made, do not poſſeſs any veſſels, by which the fluids may be diſtributed, agreeably to the more ordinary proceſs of Nature.

It may in this place not be improper to examine the theory laid down by a celebrated French Naturaliſt, in the early part of the preſent century, relative to the floreſcence, which has been aſcribed to theſe plants in common with all others; [c] and made a leading principle of the ſexual ſyſtem. Reaumur, the author alluded to, imagined he had diſcovered in the FUCUS veſiculoſus, and in the FUCUS ſerratus, both flowers and ſeeds: the former of theſe, indiſcriminately occupying the ſurface of the frons. He deſcribes each flower, as a tuft of extremely minute threads or filaments, the longeſt of them not being a line in length: yet after the moſt accurate inveſtigation, he acknowledges he was not able to diſcover the ſummits at the extremities of theſe threads, ſo neceſſary to eſtabliſh the function of the ſtamens; and of courſe was prevented from determining their preciſe character. In order to get over this difficulty, he confidently maintains the probability of the ſummits having fallen off, at the time when the filaments firſt diſcloſed themſelves: and further obſerves, that thoſe flowers only, which are ſituated at the extremities of the leaves, are inſtrumental in promoting the grains or ſeeds contained [d] therein. The aperture, through which theſe threads appear, he conſiders as the

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4 "Omnis ſpecies Vegetabilium flore et fructu inſtruitur; etiam, ubi viſus eoſdem non aſſequitur." Philoſoph. Bot. Sect. 139.

"*Muſcorum* ſemina *Nos*."
"*Fucorum* flores obſervavit *Reaumur*. &c." Ibid.

"Flos omnis inſtruitur Antheris et Stigmatibus." Ibid. Sect. 140. et ſequent.

[c] Philoſoph. Bot.

[d] Act. Gall. 1711. p. 292.

calyx.

calyx. In ſeveral other ſpecies, he obſerved the ſmall veſſels or capſules contained in the ſwollen and diſtended ſummits of the leaves; but not the ſmalleſt appearance of thoſe threads or ſuppoſed floral parts. In others again, theſe laſt were very viſible, without the former: for inſtance, the FUCUS nodoſus and FUCUS canaliculatus exhibited very diſtinctly their ſeed-veſſels, but were entirely deſtitute of the filaments. Our author therefore takes it for granted, that the plants were not examined at the time of their flowering.—Again, in the FUCUS palmatus, he found the ſurface in a manner covered with thoſe minute cluſters of hairs or flowers, obſervable in the FUCUS veſiculoſus: but, after the moſt acute inſpection, he was not able to trace out any reſemblance to ſeeds or capſules.

Baſter and Gmelin have already ſhown that the theory of Reaumur is evidently expoſed to the following objections.

Firſt. That as the fine capillary filaments were always deſtitute of the antheras, they could not be conſidered as the flowers.

Secondly. That as the ſurface of the frons was, in ſome ſpecies, perfectly entire, without having the ſmalleſt appearance of thoſe filaments, and yet abounded with the granulated veſſels or ſeeds; while others again diſcovered not the leaſt ſigns of any grains or capſules, and yet were overſpread on every part with the faſcicles of flowers—it ſhould follow, that the parts in queſtion, are, with reſpect to the ſyſtem, entirely independent of each other.[5]

But a more ſtriking and convincing proof of this being the fact, and which it was hardly poſſible could have eſcaped the obſervation of Reaumur, is, that thoſe filaments, contrary to the very nature and property of the ſtate of floreſcence, are diſtinctly ſeen on the ſurface of the plant, in its earlieſt and moſt tender ſtate, when it is ſo extremely ſmall as hardly to have attained its natural form. They are alſo equally viſible, when the diſtended ſummits are in a final ſtate of decay: and during the ſucceſſive periods, theſe ſmall filaments do not undergo any viſible kind of change.———Since then, they are deſtitute of thoſe parts, which conſtitute the eſſential properties of the flower; ſince they are ſo evidently repugnant to every principle of analogy: ſome other uſe, in conformity to the ſtructure of the plant, muſt be aſſigned to them. And from the experiment noticed above, and originally made by Reaumur; they may, with much more probability, be conſidered either as ſecretory ducts, or as veſſels deſigned for conveying nouriſhment to the frons. And thus Nature may compenſate for the want of that ſupply, which land plants, by means of their porous radicles, extract from the ſoil in which they are immoveably fixed; while the roots of the former, ſeem calculated merely to counteract the fluctuating ſtate, to which they are inceſſantly expoſed.

Hence we may obſerve the Wiſdom of Providence furniſhing to the different kinds of vegetables, properties adapted to their different ſituations. And while we ſurvey the great diverſity in the form, ſize, and ſituation of ſeeds, in the vegetable productions of the Earth; we cannot fail to remark the general uniformity, in point of ſituation, as well as ſimilarity of form and ſize, in the organs of propagation

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[5] In addition to theſe remarks, it muſt not be omitted, that Linneus, in his own editions of the GENERA PLANTARUM, publiſhed before Baſter made his objections to Reaumur, had ſhown his want of confidence in the aſſertions of that author, relating to the male flowers, by ſubjoining to his definition his uſual ſign of doubting.

pagation throughout this extenſive part of the algas. In many of the fucuſes, the ſeeds or capſules are found fixed in the ſubſtance of the leaf or frons. And in others of a more filiform ſtructure, as alſo, in many of the confervas, they are imbedded in the diſtended ſummits of the pinnulas on the ſides, and at the extremities of the frons;[6] or in ſmall axillary globules formed at the baſe of the finer branchlets.[7]

In as much then as relates to the production, ſituation, and habit of theſe minute grains or ſeeds, the fucus and conferva do not ſeem to differ.

It is not unuſual to obſerve in the ſame ſpecimen, by the aſſiſtance of a microſcope, many of the opaque grains diſtinctly formed and conglomerated together, beneath the ſurface of the frons; while in other branches, a faint cloudy appearance is the only ſign, which marks an approaching tendency to the ſame ſtate of maturity. If any floreſcence preceded the fructification of theſe plants, it might be ſought for in ſimilar inſtances: yet not the ſmalleſt appearance, which could in reality juſtify this generally received hypotheſis, is to be found.

It is worthy of notice, that Reaumur had not been able to diſcover theſe floral parts, on more than five or ſix ſpecies, throughout the very numerous genus of the fucus: and yet, circumſcribed as his theory undoubtedly is, and unfounded as it appears to be, the generic character of thoſe plants has long been eſtabliſhed upon it.[8] It was not probable, that Linneus ſhould have neglected to avail himſelf of a diſcovery, ſo favourable to his ſyſtem, and under the ſanction of that reſpectable author.[9]

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[6] As for inſtance, Fucus ſpinoſus—F. obtuſus—F. cartilagineus—F. pinnatifidus.—Conferva polymorpha, &c. &c.

The principle on which the remark is founded remains the ſame; whether the fructifications may be contained within the ſwollen ſummits of ſome ſpecies, or in the globular excreſcences, and diſtended pinnulas of others.

[7] Fucus coccineus Hudſoni—Conferva plumoſa—C. noduloſa, &c. The globules, in which theſe grains are fixed, appear under diſſection to be formed by a diſtention of the medullary ſubſtance of the plants.

[8] "FUCUS * *Reaum.* A. G. 1711. T. 9, 10, 11.
Maſculi flores?
Veſiculæ glabræ cavæ pilis intus adſperſæ.
Feminei flores.
Veſiculæ glabræ, gelatina repletæ, adſperſæ punctis perforatis ſemine fœtis."
Linn. Gen. Pl. Holmiæ. 1764.

"FUCUS. MASC. *Veſiculæ* villis intertextæ
FEM. *Veſiculæ* adſperſæ granis immerſis apice prominulis."
Hudſon—Lightfoot. &c.

In an edition of the Syſt. Nat. not long ſince publiſhed, the generic character of the fucus appears to be eſtabliſhed on more probable grounds.

"FUCUS—*Globuli* carpomorphi vel *ſemina* graniformia punctis perforatis latentia." Syſt. Nat. Edit. Gmel.

The ſubdiviſions however of the ſpecies, which the Editor of this work has taken from Gmelin's History of the Fucuses, ſeem, in ſome inſtances to require correction.—See Note 13. &c.

[9] This hypotheſis may have derived additional weight from a reference, which has been made in favour of it, by ſo great an authority as Baſter,† to the well-known work of Marſigli (Histoire Physique de la Mer. p. 160.); in which we find a very circumſtantial deſcription of a marine plant in perfect flower, accompanied with an accurate engraving of its various parts. Marſigli obſerves, that it was diſcovered oppoſite a promontory

† Baſt. Opuſc. Subs. Tom. 2. p. 130.—See the reference of Baſter, in the Latin tranſlation of the note.

From what has been advanced, it appears, that Nature, in the formation and ſtructure of this branch of the algas, has deviated from Her general mode of operation: and as there are not any proofs produced of a ſtate of floreſcence attending theſe plants; it is highly probable, that, in this inſtance, She may have recourſe to a ſimple and ſelf-efficient mode of propagation, independent of any external acceſſorial aid, and totally different from the principle, on which the ſexual ſyſtem is founded. It may be proper to obſerve, that this opinion is ſheltered under the authorities of Gmelin and Gærtner: although the latter of theſe authors ſeems to extend his hypotheſis, in too general and excluſive a manner; as will poſſibly be ſhown in the ſubſequent pages.

Gmelin, in the courſe of his remarks, obſerves, that it would not be leſs abſurd to require, than difficult to attempt an explanation of the natural proceſs, which takes place, in the original formation of the granulated veſſels, diſcovered in the fucuſes. We muſt ever be at a loſs, when we approach towards the firſt principles of any efficient cauſe. The ſame inexplicable difficulties occur in the regenerating ſprings of animal life. All that can rationally be aſſerted, is, that from theſe and ſimilar obſervations, it appears, that it hath pleaſed the Great Author of Nature, to produce the ſame effects, by a more ſimple proceſs in ſome inſtances, than in others: and that, in the various ſpecies now under conſideration, it ſhould ſeem to be ordained, that a ſelf-efficient power, eſſentially exiſting in theſe plants, anſwers every purpoſe conducive to their propagation.

For a more particular elucidation of this ſubject, it may be proper to conſult the work of Gmelin, who further obſerves, that in the plants now under conſideration, a gradual proceſs may be traced from thoſe, which are UNISEXUAL,[10] to others ſtill more ſimple, and which are perfectly ASEXUAL.

To the firſt of theſe diſtinctions,[11] Gærtner attributes the fructification of the more perfect fucuſes, which he maintains are propagated by actual ſeeds. Under the latter diviſion, the ſame author has decidedly fixed many of the fucuſes, and all the confervas without exception.

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tory called Canaille in Provence, at the diſtance of five hundred fathom from the ſhore, and at the depth of forty, entangled in a fiſhing-net. The ſtem of this plant in its ſubſtance reſembled a ſhrub: it appeared green, but was deſtitute of leaves. The corol he deſcribes as white, except the part ſurrounding the fruit, which was ſomewhat red (rougeâtre), and alſo ſome few longitudinal ſtreaks of a cheſnut colour. Having noticed the expanded petals and filaments correſponding with them, he proceeds to the ſeed veſſels, which obſerve rather a diminiſhed proportion as they approach the ſummit. They are nearly round, and on the upper part rather flat. Their colour inclines to a green, with a mixture of yellowiſh red. In the centre, is a heart-ſhaped cavity, containing ſix ſeeds.

This ſingular deſcription excited my curioſity, as well as ſuſpicion with reſpect to the real exiſtence of ſuch a plant in the ocean; and induced me to embrace the opportunity of examining the figure of Marſigli, in the preſence of the preſent learned Regius Profeſſor of Botany in Oxford. At the very firſt ſight, there remained not the ſmalleſt doubt of its being an ASPHODELUS. And the Profeſſor inſtantly recogniſed the Aſphodelus *ramoſus*, which he himſelf had long ſince remarked, as one of the moſt common of the littoral plants on the coaſts of Italy, and of the ſmaller iſlands in the South of Europe.

[10] Should not the term *uniſexual* ſeem an arbitrary and uſeleſs diſtinction? It is uſed by Adanſon, to expreſs a ſimple and ſelf-efficient power in the fructiferous parts of ſome vegetables, and here applied to a particular diviſion of the fucuſes, in contradiſtinction to others named *aſexual*, as being ſuppoſed totally deſtitute of ſeeds, and only ſubject to a proliferous mode of increaſe.

[11] "In omnibus veri nominis Fucis, ſola habentur organa feminea, intra frondium corticem abſcondita; Maſculorum autem nullum adeſt veſtigium, &c." Gært. de Fruct. p. 32.

It may be neceſſary briefly to notice the definitions, which Gærtner[12] has given of vegetable propagation, in order more clearly to underſtand that part of his theory, which is applied to the extenſive genus of confervas. He conſiders the ſource of vegetation, as dependent on a two-fold principle. One of theſe, by virtue of an inherent vital force, operates without any impregnation, in producing a diſtinct and perfect epitome of the mature plant, ſimply from the medullary ſubſtance. The other, by an operation of the organized parts, digeſts and ſeparates proper ſecretions from the general maſs, till at length by a more complex proceſs, an entire new organized body is produced, and the exact rudiments of plants are formed in diſtinct and appropriate parts. This, is termed fructification, as producing ſeeds: the former, is conſidered as a ſimple proliferous mode of increaſe. The author then applies theſe principles, to the different parts of the cryptogamous claſs.

[c]All the confervas, whether capillary or beaded (moniliformes), he maintains, are entirely deſtitute of ſeeds, and have not even the ſhadow of affinity to the ſexual ſyſtem. The moniliform or beaded confervas, e. g. C. corallinoides and others, throw out from their greater joints, ſmall lateral filaments of the ſame form and ſtructure: which conſtitute the only ſource of propagation, by a proceſs very ſimple in itſelf; as one or ſometimes two of theſe joints (articuli), are by the mere intumeſcence of their internal ſubſtance, converted into a ſingle globule; which after it hath ſeparated from the original ſtock, immediately adheres to the rock or body on which it happens to light, and from the upper part extends itſelf into a new joint; till at length it grows up, into the exact form and ſimilitude of the proliferous parent plant.

Theſe globules, Gærtner obſerves, have a very ſtrong reſemblance to the fructified parts of plants, in their texture as well as in their form and colour: yet upon examination, he affirms, they will be found to be ſimple gems, conſiſting of mere medullary ſubſtance, contained in a homogeneous bark or covering: from which circumſtance, as well as from the confluence of thoſe joints into a globule, our author maintains that they do not depend upon any other principle, than the ſimple faculty of vegetation, for their mode of increaſe.[13]

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[12] This author has lately publiſhed a valuable work, in which he has not only eſtabliſhed permanent diagnoſtics of a great part of the known genera of plants, from their FRUITS and SEEDS; but has, with the united efforts of inveſtigation and ſcience, at once exemplified the principal ſcope of former writers, with reſpect to the anatomy, texture, uſe, and œconomy of thoſe myſterious parts of plants, which more immediately relate to the propagation of vegetable life. Sometimes, however, he appears to adopt uſeleſs diſtinctions: for inſtance, he ſeparates the FUCUS plumoſus, F. cartilagineus and others under a genus named CERAMIUM, as, in his opinion, not producing ſeeds, but only *gems*, by a proliferous mode of increaſe. Gært. de Fruct. Introduct. p. 19.

[c] Gært. de Fruct. p. 16.

[13] Although Gærtner aſſerts, that the confervas, as well as all thoſe fucuſes, which are membranaceous (complanati) are ſubject only to a proliferous mode of increaſe: yet we have the cleareſt proofs, that many of the latter derive their propagation from ſeeds, in every reſpect as unequivocally as thoſe fucuſes, which have been deemed more perfect. The FUCUS rubens, i. e. crenatus of Gmelin, is truly membranaceous, very thin in its texture, and nearly tranſparent. The central nerve, which pervades the frons, frequently branches off in oppoſite directions, producing numerous leaves, which at firſt ſight, may appear as the deciduous offsprings of the proliferous parent ſtock. The margins of theſe leaves are oftentimes cloſely fringed with minute ſpines; each of which in time becomes a kind of capſule, containing many ſeeds of a faint purple colour. Not one of theſe ſeeds, when magnified, appears much larger than a particle of ſand.

The FUCUS criſpatus of Hudſon, although as delicate in its texture as the fineſt ulva, contains within its ſegments minute innate veſicles, which abound with a remarkable quantity of grains or ſeeds, in every reſpect very ſimilar to thoſe, which are obſerved in the perfect plants of this genus. Several other membranaceous fucuſes, which have been (in the Syſt. Nat.) lately ſeparated from the reſt, as being ſuppoſed ſubject only to a *proliferous increaſe;* leave us no reaſon to imagine that they are deſtitute of ſeeds. Even Gmelin, who (in Hiſt. Fucor.) ſeems firſt to have eſtabliſhed that diviſion, deſcribes a plant of this order, the margins of which were ſurrounded with opaque globules: and without being prejudiced in favour of his former opinion, candidly endeavours to account for the cauſe of this appearance, by attributing it in ſome degree to a ſtate of matureſcence: ‡ which according to the more ordinary courſe of Nature, had produced thoſe repoſitories for ſeeds, on which the propagation of the ſpecies might probably depend.

‡ Hiſt. Fucor. p. 175. Nota. 2da

Some few ſtrictures upon the theory of Gærtner, as relative to the propagation of the conſervas, will cloſe theſe remarks.

A proper generic diſtinction between the fucus and conſerva does not yet appear to be eſtabliſhed, as the characters of both genera are ſometimes blended together. The tranſverſe diaphragms and joints, the tenuity and capillary ſtructure, are the common obvious marks of diſtinction in the conſervas. Yet we find ſome ſpecies of the latter deſcribed as not being jointed; † while ſome of the fucuſes are furniſhed with diaphragms. The genus ulva ſtill adds to the confuſion, by ſometimes partaking of the properties peculiar to each of the former. The Ulva capillaris of Hudſon, for inſtance, has been frequently found with ſpherical veſicles in great abundance at the extreme branches; in which may be diſcovered ſeveral pear-ſhaped grains or ſeeds, hardly differing in colour from the reſt of the plant: from this circumſtance it might rank with the fucus. The Ulva articulata, in its jointed appearance, approaches very nearly to the character of the conſerva: while the Fucus Filum exhibits a ſeries of diaphragms, which might juſtify its being added to the laſt-mentioned genus. The Fucus incurvus ſeems to unite the diſtinctions of both genera: for the pinnulas, in the recent plant, when held to the light, frequently diſcover a regular courſe of ſeptas, which are not to be obſerved in the other parts of the fucus. The inflated leaves of the Fucus ſiliquoſus, which from their ſtrong reſemblance to pods, have furniſhed this plant with its trivial name, are ſubdivided by diaphragms that are even palpable.

It has frequently been remarked, that Nature proceeds, as by a regularly extended chain, from plants of the moſt ſimple and unorganized ſtate, to others, which from being more complex in their ſtructure, are therefore deemed more perfect. This favorite idea of a connecting ſeries, ſeems to have been followed by a more appoſite compariſon of an ingenious author,[f] who obſerving in how cloſe and inſeparable a manner the orders of Nature are ſometimes blended together; illuſtrates the proceſs by a metaphor, drawn from the interwoven meſhes of a net, which are united together by a multifarious connection. Without contending for the juſtneſs of the application to the plants in queſtion, and which are reckoned among the primary and moſt ſimple of the Natural Orders:[14] certain it is, that the conſerva, ulva, and fucus, are not at preſent ſeparated by fixed and permanent generic diſtinctions, and that they ſometimes participate in properties peculiar to each.*

Gærtner readily admits that the more perfect fucuſes are produced from ſeeds, and as confidently maintains, that the extenſive genus of conſervas derive their propagation, from a totally-different ſource: and that, in ſeveral ſpecies of the latter, it is effected ſolely by the ſmall lateral filaments, which from intumeſcence aſſume the form of globules, and falling off ſpontaneouſly from the branches, become in their turn, the ſources of a proliferous increaſe.[15]

There are, however, beyond a doubt, many conſervas, which at particular ſeaſons produce opaque granulated veſſels or ſeeds, contained within thoſe very globules, probably, which this author mentions

† See C. rivularis, C. fæniculacea, &c. Fl. Scot.

[f] Donati.

[14] "Plantæ omnium imperfectiſſimæ Byſſi et Conſervæ—in quibus Natura primordium inſtituiſſe videtur." Gmel. Hiſt. Fucor. p. 35.

* The Ulva articulata, notwithſtanding its ſtriking reſemblance to the *conſerva*, is conſidered by Lightfoot as a *fucus*. The Conferva fiſtuloſa of Dillenius, t. 6. *f*. 39. (i. e. C. tubuloſa of Hudſon) is placed under the genus *ulva* by Linneus. See Ulva confervoides. Sp. Pl. 1632.

[15] "———hac ſimplici formantur methodo ut nunc unicus, nunc duo ſibi proximi, lateralium filorum articuli, per meram ſubſtantiæ ſuæ carnoſæ intumeſcentiam, in unicum globulum ſolidum convertantur, qui poſtea ſponte decidit, et *dum ex altera parte ſcopulis agglutinatur, ex altera novum trudit articulum*". Gært. de Fruct. p. 16.

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tions as being in themſelves, the original and only ſource of increaſe. He has unfortunately fixed upon the Conferva corallinoides—a ſpecies, of all others, leaſt favourable to his hypotheſis. This conferva is of ſo ſimple a texture, that it has the appearance of a fine tubular tranſparent membrane, which at length acquires a beautiful crimſon fluid. In this ſtate, it is ſometimes, but not frequently diſcovered with dark cluſters or protuberances ſurrounding the joints (as noticed by Mr. Lightfoot). Theſe, when under a microſcope, are found to contain a great number of dark purple ovate veſſels; but whether the latter are ſeeds, or only pericarps containing more minute particles, does not appear. If the plant at this time be placed between papers, it will ſoon diſcharge its interior crimſon fluid, leaving only a jointed tranſparent film, the veſſels at the joints excepted, which retain a degree of ſolidity and opacity, very different from the other part of the plant. Now as theſe granulated bodies are ſo very diſtinct from the internal ſubſtance of the conferva; it is highly probable, they are formed by that proceſs and peculiar ſeparation of the general maſs, on which Gærtner ſcientifically eſtabliſhes the origin of ſeeds—in contradiſtinction to the ſimple increaſe of medullary ſubſtance, on which he has founded the principle of propagation by gems.[15] In ſhort, that by a ſecretion of the fluid, an entire new organized body is formed; or, in other words, the pericarps or ſeeds. If then, according to this author's mode of reaſoning, the grains contained in the more perfect fucuſes are actual ſeeds, and the ſources of increaſe—it ſhould follow, from the inſtance juſt given, and from others which might be produced, that the confervas alſo, derive their propagation from the ſame principle.

This opinion ſhould ſeem more probable than that laid down by Gærtner, becauſe the origin of all theſe plants is imperceptibly ſmall; ſince we find them growing upon the ſmootheſt and moſt gloſſy ſurfaces of plants, and as frequently upon the fineſt capillary branches of fucuſes, full as minute as the confervas that are attached to them. In theſe fine branches, however, there muſt be ſome nidus or repoſitory, ſufficiently capable of affording ſhelter and protection to thoſe minute ſeminal atoms, which eſcape from veſſels ſimilar to thoſe before deſcribed. Neither is it eaſy to conceive in what manner the mode of propagation could ſucceed, according to Gærtner's theory: for as the confervas are frequently of an equal ſize with thoſe branches which ſupport them, it is by no means probable, that the jointed globule of a conferva (if this may be the author's meaning) could ſo inſtantaneouſly attach itſelf to ſuch a body, and with tenacity ſufficient to reſiſt the conſtant colliſion of tides.

That the globules conſiſt of the medullary ſubſtance of the plant itſelf is readily admitted: at the ſame time, it muſt be allowed, that all the confervas, which produce the granulated veſſels or ſeeds imbedded in thoſe globules, bear a ſtriking reſemblance, in their mode of propagation, to the more perfect fucuſes; and not being apparently ſubject to the laws of floreſcence, attain their ſtate of fructification in a manner exactly ſimilar to that, which has been aſcribed to the latter: from an inherent ſelf-efficient principle, equivalent indeed, though entirely different to that, on which the ſexual diſtinction is founded.

It might be almoſt ſuſpected from the above paſſage, that Gærtner had too haſtily embraced the opinion of Adanſon, without having duly attended to theſe plants, through the different ſtages of their growth.—" On peut dire que dans le Conferva même, qui n' a point de graînes, l' articulation qui en tient lieu, eſt analogue aux Embrions monocotulédons, puiſqu' elle vegète *d' abord par un extrémité qui ſert de racine, en s'appliquant à divers corps, et enſuite par l' extrémité opoſée qui forme des tijes.*" Adans. Fam. Plant. par. 1. p. 304.

[15] " Quod gemmæ medulla, fit *pars identica* medullæ maternæ; dum contra ſeminis medulla, non poſſit non eſſe noviſſima et a matris ſuæ diſtinctiſſima." Gært. de Fruct. p. 9.

tions as being in themſelves, the original and only ſource of increaſe. He has unfortunately fixed upon the Conferva corallinoides—a ſpecies, of all others, leaſt favourable to his hypotheſis. This conferva is of ſo ſimple a texture, that it has the appearance of a fine tubular tranſparent membrane, which at length acquires a beautiful crimſon fluid. In this ſtate, it is ſometimes, but not frequently diſcovered with dark cluſters or protuberances ſurrounding the joints (as noticed by Mr. Lightfoot). Theſe, when under a microſcope, are found to contain a great number of dark opaque globules; but whether the latter are ſeeds, or only pericarps containing more minute particles, does not appear. If the plant at this time be placed between papers, it will ſoon diſcharge its interior crimſon fluid, leaving only a jointed tranſparent film, the veſſels at the joints excepted, which retain a degree of ſolidity and opacity, very different from the other part of the plant. Now as theſe granulated bodies are ſo very diſtinct from the internal ſubſtance of the conferva, it is highly probable, they are formed by that proceſs and peculiar ſeparation of the general maſs, on which Gærtner ſcientifically eſtabliſhes the origin of ſeeds—in contradiſtinction to the ſimple increaſe of medullary ſubſtance, on which he has founded the principle of propagation by gems[†]. In ſhort, that by a ſecretion of the fluid, an entire new organized body is formed; or, in other words, the pericarps or ſeeds. If then, according to the author's mode of reaſoning, the grains contained in the more perfect fucuſes are eſteemed ſeeds, and the ſources of increaſe—it ſhould follow, from the inſtance juſt given, and from others which might be produced, that the confervas alſo, derive their propagation from the ſame principle.

This opinion ſhould ſeem more probable than that laid down by Gærtner, becauſe the origin of all theſe plants is imperceptibly ſmall; ſince we find them growing upon the ſmootheſt and moſt gloſſy ſurfaces of plants, and as frequently upon the fineſt capillary branches of fucuſes, full as minute as the confervas that are attached to them. In theſe fine branches, however, there muſt be ſome nidus or repoſitory, ſufficiently capable of affording ſhelter and protection to thoſe minute ſeminal atoms, which eſcape from veſſels ſimilar to thoſe before deſcribed. Neither is it eaſy to conceive in what manner the mode of propagation could ſucceed, according to Gærtner's theory: for as the confervas are frequently of an equal ſize with thoſe branches which ſupport them, it is by no means probable, that the jointed globule of a conferva (if this may be the author's meaning) could ſo ſpontaneouſly attach itſelf to ſuch a body, and with tenacity ſufficient to reſiſt the conſtant colliſion of tides.

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[illegible] from the above paſſage, that [illegible] has erroneouſly conferred the appellation [illegible] ſeeds, having only attended to the [illegible] plants, through the different ſtages of their growth. "On peut dire que chaque Conferve [illegible] petit de graines. [illegible] l'articulation qui [illegible] plantes [illegible] comme [illegible]" Adan. Fam. Plant. part. 1. p. [illegible]

† "Quod gemmæ medullam [illegible] corticem [illegible]" Gærtner [illegible]

DE PLANTARUM MARITIMARUM PROPAGATIONE.

NATURALIUM rerum indagatoribus luctui diù fuit et opprobrio, maritimas plantas, non minùs formâ peculiares quam venuſtate eximias, in occulto plurimùm adhùc latuiſſe; reliquas autem Cryptogamiæ claſſis ſeries, quaſi notatu digniores, in lucem apertè prodiiſſe.[1]

Si Gmelinum, qui fucorum hiſtoriam ingenii acumine æquè ac experimentorum copiâ illuſtravit, et Gærtnerum, qui plantarum fructus et ſemina inveſtigavit, è numero excipiamus, Scriptorem haud facilè inveniemus ullum, qui manum ad plantarum maritimarum propagationem è tenebris ſuis eruendam feliciter admoverit. Baſteri etenim obſervationes perpaucæ admodùm, obitèrque occurrentes unam tantùm alteramve ſpeciem huic generi ſubjectam reſpiciunt: et ſubtiles Reaumurii de fucorum floreſcentiâ contemplationes in ACTIS GALLICIS oblatæ, infelicem potiùs conjecturam, quàm veritatis ſimplicitatem, ſapiunt.

Notandum porrò eſt, quòd plantarum maritimarum deſcriptiones, quoad fructificationem, quæ botanicis libris interdum inveniuntur, haudquaquam, ut par eſt, experimentis ſæpiùs repetitis, ſimilitudine autem inter vegetabilia ut dicuntur perfectiora, potiùs aſſumptâ nituntur.[2] Nec multúm equidem ſperare licet à perſunctoriis iſtorum obſervationibus, qui maritima loca raro adeunt, citò relinquunt: quibus ſcilicet utcunque acutis ſolertibuſque indagatoribus, vix unquam tardos harum plantarum ad fructificationem progreſſus, et obſcuras formæ viciſſitudines obſervandi ſe præbet occaſio.

Nil mirum eſt, quod celeberrimus ille omnium Botanices ſtudioſorum Linneus, vix quidquam certi expertivè de magnâ ſucorum et conſervarum copiâ proferret: omnes enim horum ordinum plantas enumeràſſe,[3] et experimentis ſigillatim probâſſe admodùm fuiſſet difficile. Quis autem non jure admiratus eſt præclaras illas ingenii vires, judicii acumen, mentiſque captum, quibus indigeſtam vegetabilium molem in certos ordines definitaſque claſſes compoſuit, enucleatèque adeò diſtinxit, ut quæcunque poſthàc de propagatione plantarum invalebunt opinionum commenta, definiendi tamen et inveſtigandi facultates non poterunt non eſſe promotæ.

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[1] Per "lumen à Dillenio imprimis accenſum," clariora evaſerunt Hedvigii in Muſcos et Lichenes detecta. Nec noſtratis Dickſoni opera eſt tacenda, quam in hiſce plantis inveſtigandis, et in earundem cognitione perficiendâ, inſumpſit.—Lichenes et Sphærias, illuſtrantem vidimus, Hoffmannum; necnon Filices Britannicas, Boltonum.—In Fungis evolvendis deſudarunt plurimi Botanici: inter alios, Batſchius, Boltonus, Schæfferus, Bulliardius. Horum omnium opera, iconibus nitidiſſimis elegantiſſimè elaboratis, et ad vivum expreſſis, locupletantur.

[2] Huic opinioni, in Jacquinii COLLECTANEA relatæ favet Wulfen, ubi de FUCO corniculato ita loquitur. "Veſiculas veras fœmineas hoc in fuco haud detexi; maſcula contra tubercula hemiſphæroidica, apice poro impreſſo umbilicata, et in foliorum lateribus . . . . ſuo occurrere ſolent tempore." (Collect. Tom. 1. p. 359.) F. concatenatus, et F. ſelaginoides, ibid. quos vide. p. 354—356.
Vid. CONFERVAM polymorpham—C. plumoſam—et C. noduloſam. Fl. Scot. p. 990—996, &c.

[3] Cl. Hudſonus in *Florâ ſuâ Anglicâ* maritimas plantas multò plures, quam Linneus toto orbe Terrarum collectas deſcripſit. Vid. Sp. Pl. Edit. 2da Holm.

A ſyſtemate tam accuratè digeſto, tam longè latèque recepto vel minimùm deflectere, ſuſpicionem temeritatis et novitatis ſtudii fortaſſe ſuggerat; in mentem tamen revocare par eſt, quòd principia iſta, quibus ſyſtema ſexuale innititur quoad plantarum genus, de quo nunc agitur; auctori ipſo lauditiſſimo haud extra controverſiam poſita eſſe videantur. Facile eſt tamen conjectari tam ex libro Linnei de Generibus Plantarum, quam ex aliis ejuſdem auctoris ſcriptis, quòd doctrinam ſuam de efficaciâ ſexuali ad unamquamque Regni vegetabilis partem extendi voluerit: immò ad plantas ſcilicet de quibus nunc tractetur; quas ob exilitatem partium propagationi inſervientium ſub nomine Cryptogamicarum ſepoſuerat.[a]

Inter varia auctorum opera, quæ Botanices rudimenta tyronibus tradunt, et fontes ſcientiæ aperiunt, nec elaboratum magis nec utilius eſt, quam PHILOSOPHIA BOTANICA: opus Viri nunquam ſatis laudandi, quod non ſolùm lucidiſſimo ordine conſtructum hujuſce ſcientiæ meritò habetur baſis et fundamen; ſed NUMINIS OPTIMI MAXIMI Sapientiam ante oculos manifeſtè profert et mirificè illuſtrat. Utcunque breve eſt hoc opus et ſuccinctum, ab illo tamen quaſi fonte et origine enata ſunt varia opuſcula, et utilitate ſummâ et ſcientiâ repleta, inter AMŒNITATES ACADEMICAS ejuſdem auctoris evulgata. Horum unum præſertim principia iſta plenè dilucidèque expedit, è quibus pendet de plantarum ſexibus doctrina.[b] In hoc etiam quamplurima proferuntur exempla, quæ Naturæ Providentiam arguunt, quâ multiplices ſuæ Familiæ proteguntur: quorum quidem, vix præclariùs occurrit quàm quod obſervari liceat in Œconomiâ plantarum aquis altè ſubmerſarum. Harum quædam præfinito flores ſuos aperiendi, nequicquam autem alio, tempore, ſeſe ſuper aquas, ut farina per aerem liberè volitans deſtinatam ſuam obtineat ſedem, emergentes oſtendunt, denuòque ſubmerguntur. Si plantis aquas leniter-fluentes habitantibus tanta Providentiæ, ut genus ſuum propagent, adhibeatur Cura; ſi porrò communi quâdam et immutabili lege ut exiſtimandum eſt, agat Natura:[4] operis haud exigui eſſe conſtabit, iſtarum plantarum, quæ, imo ſub oceano permanentèr et funditùs infixæ, nihilominus incunabula generationi ſuæ maximè idonea et amica inveniunt, propagandi rationem inveſtigare.

In hâc enim inveſtigatione mutuus vegetabilium inter ſe ſimilitudinis nexus, haud ampliùs præmonſtrat iter. Maritimâ quâvis plantâ obitèr inſpectâ, nequaquam invenienda eſt præclara illa inter quaſdem animalium et vegetabilium partes cognatio; inter terreſtrium ſcilicet plantarum radicum fibras, et lactea animalium vaſa. Fucorum etenim radices, non ſolùm vaſis ullis abſorbentibus ſuccum coquere et diſtribuere, nullibi aſpicimus, verùm etiam ob duritiem ſuam et texturam coriaceam, ad nihil prorsùs niſi ad firmandam ſibi inter fluctus ſtationem, videntur adaptatæ: læviſſimis enim lapillis aliiſque corporibus ſuccum nutritium omninò denegantibus, hærent affixæ. Fuci equidem de quibus agitur, ſi vel radicum, vel aliarum partium ſtructuram contemplemur, vaſorum, quibus ſuccus propellitur, ſeriem habere nullam videntur. Horum autem vices ſupplent innumera quaſi plantarum cuti inter-

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[a] Claſſis Cryptogamia.

[b] Sponſalia Plantarum.

[4] "Omnis ſpecies Vegetabilium flore et fructu inſtruitur; etiam, ubi viſus eoſdem non aſſequitur." Philoſoph. Bot. Sect. 139.

"*Muſcorum* ſemina *Nos.*"

"*Fucorum* flores obſervavit *Reaumur.* &c." Ibid.

"Flos omnis inſtruitur Antheris et Stigmatibus." Ibid. Sect. 140. et ſequent.

ſperſa

ſperſa ſpiramenta vel pori. Ad examen hoc facilè vocatur; ſiccata enim hujuſce generis planta ſi in aquâ tota immergatur, ad priſtinam redibit formam et ſtatum; ſi verò pars tantùm immittatur, reliqua manebit arida prorsùs et marcida.—Hinc liquidò patebit, fucis hiſce nulla eſſe vaſa vel canales quibus per totam, ut plerumquè fit, plantam ſuccus diſtribuatur.

Ut veritatem faciliùs aſſequamur, conjecturas inclyti cujuſdam philoſophi de plantarum harum floreſcentiâ ad examen revocare fas ſit; his enim fidem dederunt quidam recentiores, et ad firmandam ſexûs plantarum doctrinam, et methodum inde Linneanam, hæc celebris viri detecta, ut putantur, adduxerunt. Reaumurius, qui hìc loci deſignatur, ſibi viſus eſt in Quercû marina,[c] atque in Fuco ſerrato, et flores et ſemina detexiſſe; flores quidèm frondis ſuperficiem ſine ullo diſcrimine occupantes: unumquemque florem deſcribit ut faſciculum filamentorum capillarium, quorum longiſſimum, lineam haud æquabat: ſummâ verò diligentiâ ſcrutatus, ſe libens confitetur nec faſtigia filamentis his, nec capita cernere poſſe; quæ tamen, ſi filamenta, vera eſſent ſtamina, antheris ornari certè deberent. Hunc nodum dirimere aggreſſus, veriſimillimum eſſe hæc capita, quamprimùm ſe protrudebant filamenta, decidiſſe auſus eſt affirmare: et porrò flores tantùm illos, qui extremas occupant frondes, inſtrumenta eſſe, quibus ſeminiferi fucorum apices promoveantur. Foramen etiam ex quo ſe trudunt filamenta, calycem eſſe ducit. In quibuſdam ſpeciebus fructificationem affirmat ſummis frondibus ineſſe turgidulis et paulùm diſtenſis, dum flores, ſic enim has partes reputari nonnullis placuit, omninò latebant. In aliis contrà, hæ poſtremæ partes ſine ſuperioribus videndæ erant. In Fucis ſcilicet canaliculato, et nodoſo, globuli carpomorphi ſeſe exhibebant, ſine ullis florum filamentis: hi igitur, ait Reaumurius, floreſcendi tempore nunquàm oculis ſubjiciebantur. Fuci palmati contrà ſuperficies, filorum iſtorum, vel ut ſibi videtur florum, faſciculis obtecta erat: nihil autem vel ſeminibus vel capſulis ſimile attentiſſimâ inſpectione cernendum erat.

A Baſtero et Gmelino dudum obſervatum fuit Reaumurii hypotheſin reprehenſioni quodammodo obnoxiam eſſe.

Imprimis. Quòd filamenta capillaria ſemper antheris vel apicibus deſtituta, nunquàm pro floribus haberi poſſint.

Secundò. Quòd, in quibuſdam fucorum ſpeciebus, frondis ſuperficie, integrâ prorsùs et ſine ullis filamentis exiſtente, granulis verò nidulantibus cumulatè inſtructâ, in aliis contrà nulla ullibi ſeminum præ ſe ferente, florum autem, ut voluit, faſciculis coopertâ—hanc potiùs quàm Reaumurii opinionem ſequeremur oporteat; nimirum, fucorum partes ſupradeſcriptas nullo inter ſe ſyſtematis vinculo connecti, unâ nequaquam ab alterâ pendente.[5]

Quod autem pleniùs hoc et meliùs evincit, Reaumurio vix ignotum, id pro certo ſtatuamus; ſcilicet iſta filamenta floreſcentiæ naturâ et ratione tam longè abeſſe, ut in ſuperficie plantæ enaſcentis, teneræ et ad integram ſuam formam nondùm perventæ videantur. Apparent etiam haud obſcuriùs in fron-

[c] Fuco veſiculoſo.

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[5] Nec porrò ſupervacaneum eſt obſervare, quod Linneus, in operis ſui Genera Plantarum denominati editionibus ſub ſuâ ipſius inſpectione prolatis, antequam Baſterus Reaumurii opinionibus ſe oppoſuerat, ſe parùm credere Reaumurii de maſculis floribus dogmatibus oſtenderat, ſignum dubitationis ſibi uſitatiſſimum definitioni ejus ſubjiciendo.

dis ſuperficie, dum faſtigia ejuſdem cum ſuis pericarpiis jam ſeneſcere cœperint et marceſcere; et in hoc toto temporis intervallo nullam quamcunque quæ cernitur, mutationem ſubeunt. Quandoquidem igitur filamenta hæc illis carent partibus, quæ flori ipſi eſſentiales ſunt, quandoquidem nullo cum aliis plantis ſimilitudinis nexu ſociantur; ad uſum quemnam alium plantarum harum ſtructuræ convenientem deſignata fuiſſe conſtat. Experimento nupèr deſcripto, ea ductus eſſe ſecretorii, vel vaſa ſuccum nutritium frondi tranſmittentia, cenſenda ſunt. Hâc quidem ratione compenſetur iſtius nutrimenti deſiderium, quod terreſtres plantæ radicibus ſuis poroſis è ſolo quo fixæ permanent, nunquàm non derivant: maritimarum intereà radicibus, fluctuum violentiæ, ne jactentur plantæ, ſeſe ſolùm opponentibus.

Hinc apparet Providentis Naturæ Sapientia, quæ unicuique generi partes ſuas et ſitus ſtatuit vegetationi aptiſſimos. Dum in ſeminibus plantarum terreſtrium, formæ magnitudinis et ſitus diverſitatem contemplamur; non poſſumus non reſpicere ſimilitudinem organorum propagationi inſervientium, quoad formam, ſitum, et magnitudinem, plantas maritimas pervadentem. In fucis pleriſque, ſemina aut capſulæ in frondium ſubſtantiâ inſeruntur. Et in quibuſdam horum, ſtructuræ potiùs filiformis; et in confervis plurimis, aut diſtenſis plerumquè pinnularum faſtigiis;[6] aut ramuſculorum veſiculis axillaribus continentur.[7]

Quod igitur grana carpòmorpha, quoad ſitum, habitum, et originem reſpicit, confervas non multùm a fucis diſtare affirmetur.

In uno eodemque ſpecimine ſæpe cernantur corpuſcula hæc granulata frondis dilatatæ parti ſimul conglomerata; dum in aliis ramulis, nebulæ quædam leviuſculæ ſola ullius cujuſpiam ad maturitatem progreſsûs ſigna produnt præcurſoria. Si floreſcentia ulla fructificationem harum plantarum anteiſſet, in hiſce et talibus ſpeciminibus dudum eam inventam fuiſſe credibile eſt: nihil verò receptæ huic hypotheſi colorem daturum adhùc eſt repertum.

Obſervandum eſt, quòd Reaumurius hæc filamenta capillaria non niſi in paucis, quinque nempe aut ſex fucorum ſpeciebus cernere poſſet. His pauculis tantùm et tam dubiis exemplis, character generis fucorum numeroſiſſimi videtur niti.[8] Nil mirum eſt, quod Linneus huic digniſſimo

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[6] Ut Fucus ſpinoſus—F. obtuſus—F. cartilagineus—F. pinnatifidus.—Conferva polymorpha, &c. &c.

Quid enim differt, ſi in tumidis frondium tantummodò apicibus, ſeu in ramuſculorum globulis, vel pinnulis diſtenſis, nidulantia deprehendantur granula?

[7] Fucus coccineus Hudſoni—Conferva plumoſa—C. nodulosa, &c. Veſiculæ, in quibus hæcce granula ſeminalia conſpicienda ſe præbent, ex identicâ medullâ maternâ et cortice, conflatæ videntur.

[8] "FUCUS * *Reaum.* A. G. 1711. T. 9, 10, 11.
Maſculi flores?
Veſiculæ glabræ cavæ pilis intus adſperſæ.
Feminei flores.
Veſiculæ glabræ, gelatina repletæ, adſperſæ punctis perforatis ſemine fœtis."
Linn. Gen. Pl. Holmiæ. 1764.

"FUCUS. MASC. *Veſiculæ* villis intertextæ.
FEM. *Veſiculæ* adſperſæ granis immerſis apice prominulis."
Hudſon—Lightfoot. &c.

In

niſſimo auctori nimium fidens, ſententiam, quæ honorem dabat methodo ſuæ acciperet ultrò et foveret.[9]

Cùm hæc contemplemur, clarius fortaſsè patebit, quòd dum harum ſtructuram algarum moliretur Natura, paululùm deflexerit ab uſitatâ ſuâ operandi ratione, et quòd nullis prolatis de floreſcentiâ harum plantarum teſtimoniis, veriſimillimum duceretur in his propagandi modum ſimplicem eſſe et ſibi ipſis vi inſitâ reſtrictum, ab ullo exteriori adjumento nequaquam pendentem, et à principiis quibus ſexuum diſtinctio aſſeritur, prorsùs alienum. Notatu dignum videatur, quòd opinio hæcce Gmelini et Gærtneri auctoritate commendata ſe prodat, quanquam auctorum horum poſtremus hypotheſin ſuam latè nimis et temerè extendiſſe videtur.

Abſurdum eſſet, ut ait Gmelinus ipſe, ſperare, æquè ac difficile proferre granorum iſtorum fucis ſe prodentium primæ formationis explicationem. Semper enim neceſſe eſt a ſpe decidamus, cùm ad primarias rerum cauſas expediendas nos accingamus. Hæc eadem et de vita animalium et vegetabilium ubique conſtant. Pudoris eſt æquè ac prudentiæ intra hos limites noſmetipſos ſiſtere.—“ Neque plus novi,” inquit, “quam quod ejuſmodi obſervationibus edoceor, ſimpliciori methodo voluiſſe hic CREATOREM eundem finem adſequi, voluiſſe nimirum per ſola grana in ſe fœcunda h. e. vi inſita, nec aliena indigente, prædita, fucorum procreationi proſpicere.”

Si materiam hanc ſubjectam contemplari velimus fuſiùs explicatam, Gmelini opus curioſiùs evolvendum eſt. Ille enim Naturæ notat progreſſum, quem quidèm hiſce algarum generibus convenire affirmat: in quibus plantis pedetentìm deſcendendum eſt ab iſtis, quæ UNISEXUALES,[10] ad illas, quæ prioribus ſimpliciores prorsùs ASEXUALES orientur.

Horum primis[11] perfectiorum fucorum fructificationem tribuit Gærtnerus, quos fidentèr affirmat veris ſeminibus propagari. Sub poſtremis, fucos plurimos, et omnes omninò conſervarum ſpecies annumeravit.

In editione Syſt. Nat. nuperrimè evulgatâ, character fuci genericus auſis melioribus profertur.

“FUCUS—*Globuli* carpomorphi, vel *ſemina* graniformia ſub punctis perforatis latentia.” Syſt. Nat. Edit. Gmel.

Specierum verò diſtributiones, quas è Gmelini HISTORIA FUCORUM, Editor deſumſit, dies forſan, tum fructificationes earundem impenſiùs inveſtigandi occaſio, accuratiores reddat. Vid. Not. 13. &c.

[9] Hæc forſan Reamurii hypotheſis auctoritate cl. Baſteri fuerit commendata, citato ab illo opere Comitis Marſiglii celeberrimo (HISTOIRE PHYSIQUE DE LA MER. p. 160.); in quo loco maritimam plantam perfectos flores gerentem ſigillatim deſcribit, Iconem addens partes ejuſdem accuraté referentem. Baſteri verba ita ſe habent. “Quamvis magnus Botanicus RAJUS neget plantas unquam ſub aqua apertos flores gerere, non tamen hoc ſine exemplo eſſe crediderim. Illuſtriſſimus Comes MARSIGLI *plantam* deſcribit et delineat, quæ ab altitudine quadraginta, et ad diſtantiam quingentarum orgyjarum a littore, ad Promontorium *Canailje* dictum, in PROVINCIA, ex mari extracta eſt, quæ apertos et marcidos flores et fructus gerebat. Flores habebant ſex petala, ſex ſtamina antheris ſuis inſtructa. Apex plantæ multos adhuc clauſos habebat flores.” Opuſc. Subſeciv. Tom. ſecund. p. 130.

Singularis hæc deſcriptio indagandi in nobis ſtudium excitavit, non ſine quâdam ſuſpicione, an non talis exſtiterit in oceano planta, et nos impulit oblatam tandem occaſionem amplecti Marſiglii tabellam cum doctiſſimo Botanices in Oxonio Profeſſore regio inſpiciendi. Plantam, Aſphodelum fuiſſe nequaquam in dubio verſabatur; et Profeſſor illam Aſphodelum *ramoſum* fidentèr annunciavit; plantam, quam dudum obſervaverat ipſe in maritimis Italiæ oris et in inſulis parvis Europæ auſtralibus, perfrequentem.

[10] Diſtinctio iſta, quæ voce *uniſexualis* facta eſt, inutilis prorsùs eſſe videtur. Hâc voce Adanſonus intelligit vìm ſimplicem et efficacem ſibi ipſi relictam in feminiferis quorundam vegetabilium partibus, et hìc fucis ut dicuntur veri nominis applicatùr, ut ab illis ſecernerentur, qui *aſexuales* nominantur, utpotè, qui ſeminibus omninó carent et per gemmas propagantur.

[11] “In omnibus veri nominis Fucis, ſola habentur organa feminea, intra frondium corticem abſcondita; Maſculorum autem nullum adeſt veſtigium. &c.” Gært. de Fruct. p. 32.

Si iſtam hypotheſeos ſuæ partem, quæ hoc plantarum genus tractat, animo velimus comprehendere; neceſſe forſan ſit definitiones, quibus vegetabilium propagationem incluſit Gærtnerus,[12] inſpicere. Vegetationis originem duplici ex fonte derivatam eſſe affirmat. In altero, “Materies vegetabilis ſolis adjuta vitæ viribus, ſecundum inquilinum cujuſlibet plantæ creſcendi ſchema, in novas formas mutatur, atque ſua ſponte adultarum ſtirpium nova producit exempla.” In altero, “tenuiores fluidioreſque ejus partes, miniſterio propriorum organorum, a reliqua maſſa ſecernuntur atque ita elaborantur ut ex harum demum congrua miſcela, mutuaque inter ſe actione, novum prorſus emergat corpus organicum, verique in diſtinctis conceptaculis excitentur plantarum fœtus.” Hunc poſteriorem naſcendi modum, Fructificationem appellat, quia ſemina hìnc trahunt originem: priorem illum, Gemmificationem, et unicam propagationis proliferam rationem ducit. Hæc principia poſteà ad diverſa cryptogamiæ claſſis genera ab auctore noſtro adaptantur.

[d] “Conſervæ omnes,” ait ille, “tam capillares, quam moniliformes, ſexu et ſeminibus in perpetuum deſtitutæ ſunt. Priores, e ſponte ſolutis, necquidquam mutatis articulis ſuis regerminant. . . . Conſervæ autem moniliformes ut corallinoides—et variæ aliæ adhucdum innominatæ, promunt ex juncturis majorum ſuorum articulorum brevia quædam filamenta lateralia, quæ et ipſa ex parvis articulis conſlata ſunt, et ex quibus ſolis, earundem propagationis organa, hac ſimplici formantur methodo, ut nunc unicus, nunc duo ſibi proximi, lateralium filorum articuli, per meram ſubſtantiæ ſuæ carnoſæ intumeſcentiam, in unicum globulum ſolidum convertantur, qui poſtea ſponte decidit, et dum ex altera parte ſcopulis agglutinatur, ex altera novum trudit articulum, atque ſic ſenſim in plantam convaleſcit matri ſuæ prorſus ſimilem.” Ingens eſt, ait Gærtnerus, horum globulorum cum vero quodam fructu vel ſemine ſimilitudo, quoad duritiem formam et colorem: “his tamen non obſtantibus, quilibet libenter eis inter ſimplices gemmas locum concedet, qui vel internam globulorum rimatus fuerit fabricam, utpote ex mera medulla atque cortice compaginatam; vel qui eorundem imprimis ſpectaverit ortum, quippe qui, ex confluente ſæpius duorum articulorum in unum globulum medulla, excitatus, nonniſi vegetationis, nequaquam vero fœcundationis opus eſſe poteſt.”[13]

Quædam in Gærtneri hypotheſin de conſervarum propagatione obſervationes, libellum huncce ad finem producent.

Generis fucorum et conſervarum idonea diſtinctio inter deſiderata adhuc manet: utpote ſine diſcrimine utrumque genus alterius characterem nonnunquam affectare et perſonam induere videtur. Tranſverſa enim ſepta, articuli, et tenuitas fabricæ filiformis obvium conſervis diſtinctionis characterem

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[12] Hic auctor utiliſſimum opus Botanicorum manibus atterendum nuper edidit: in quo non ſolùm plantarum generum diſtinctiones, fructibus et ſeminibus ſuis inſpectis ſtatuit: verumetiam ſcientèr feliciterque aliorum auctorum obſervationes, quoad formationem, texturam et uſum iſtarum partium, quæ propagationi vegetabilium inſerviunt, illuſtravit. Nonnunquam tamen diſtinctionibus parùm (ut videtur) idoneis verſatur, quæ characteres genericos conturbant et implicatiores reddunt. e. g. FUCUM plumoſum et F. cartilagineum alioſque ſeorsìm ponit, includens eos ſub genere CERAMIO. Probare enim enititur* “quod eorum globuli ex identica matris medulla formentur et propria ſua virtute, per papillulas e vertice ſuo (ut dicit) pullulantes, in novas plantas procreſcere queant . . . dum contra in omni genuino Fuco vera reperiantur ſemina.”

* Gært. de Fruct. Introduct. p. 19.

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[d] Gært. de Fruct. p. 16.

[13] Fucos omnes complanatos ſemine in perpetuum deſtitutos, et per meras gemmas propagari auſus eſt affirmare Gærtnerus. Luculentiſſimum verò habemus documentum, quòd in nonnullis eorum æquè ac in fucis (ut dicuntur) perfectioribus, per ſemina vera locum habeat propagationis ratio. e. g. FUCUS rubens fronde membranaceâ et verè complananâ conſiſtens, haud raró plurima foliola è nervo intermedio, more prolifero protrudit, “ita

ut

DE PLANTARUM MARITIMARUM PROPAGATIONE.

NATURALIUM rerum indagatoribus luctui diù fuit et opprobrio, maritimas plantas, non minùs formâ peculiares quam venuſtate eximias, in occulto plurimùm adhùc latuiſſe; reliquas autem Cryptogamiæ claſſis ſeries, quaſi notatu digniores, in lucem apertè prodiiſſe.[1]

Si Gmelinum, qui fucorum hiſtoriam ingenii acumine æquè ac experimentorum copiâ illuſtravit, et Gærtnerum, qui plantarum fructus et ſemina inveſtigavit, è numero excipiamus, Scriptorem haud facilè inveniemus ullum, qui manum ad plantarum maritimarum propagationem è tenebris ſuis eruendam felicitèr admoverit. Baſteri etenim obſervationes perpaucæ admodùm, obitèrque occurrentes unam tantùm alteramve ſpeciem huic generi ſubjectam reſpiciunt: et ſubtiles Reaumurii de fucorum floreſcentiâ contemplationes in ACTIS GALLICIS oblatæ, infelicem potiùs conjecturam, quàm veritatis ſimplicitatem, ſapiunt.

Notandum porrò eſt, quòd plantarum maritimarum deſcriptiones, quoad fructificationem, quæ botanicis libris interdum inveniuntur, haudquaquam, ut par eſt, experimentis ſæpiùs repetitis, ſimilitudine autem inter vegetabilia ut dicuntur perfectiora, potiùs aſſumptâ nituntur.[2] Nec multúm equidem ſperare licet à perfunctoriis iſtorum obſervationibus, qui maritima loca rarò adeunt, citò relinquunt: quibus ſcilicet utcunque acutis ſolertibuſque indagatoribus, vix unquam tardos harum plantarum ad fructificationem progreſſus, et obſcuras formæ viciſſitudines obſervandi ſe præbet occaſio.

Nil mirum eſt, quod celeberrimus ille omnium Botanices ſtudioſorum Linneus, vix quidquam certi expertivè de magnâ fucorum et conſervarum copiâ proferret: omnes enim horum ordinum plantas enumeràſſe,[3] et experimentis ſigillatim probâſſe admodùm fuiſſet difficile. Quis autem non jure admiratus eſt præclaras illas ingenii vires, judicii acumen, mentiſque captum, quibus indigeſtam vegetabilium molem in certos ordines definitaſque claſſes compoſuit, enucleatèque adeò diſtinxit, ut quæcunque poſthàc de propagatione plantarum invalebunt opinionum commenta, definiendi tamen et inveſtigandi facultates non poterunt non eſſe promotæ.

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[1] Per "lumen à Dillenio imprimis accenſum," clariora evaſerunt Hedvigii in Muſcos et Lichenes detecta. Nec noſtratis Dickſoni opera eſt tacenda, quam in hiſce plantis inveſtigandis, et in earundem cognitione perficiendâ, inſumpſit.—Lichenes et Sphærias, illuſtrantem vidimus, Hoffmannum; necnon Filices Britannicas, Boltonum.—In Fungis evolvendis deſudarunt plurimi Botanici: inter alios, Batſchius, Boltonus, Schæfferus, Bulliardius. Horum omnium opera, iconibus nitidiſſimis elegantiſſimè elaboratis, et ad vivum expreſſis, locupletantur.

[2] Huic opinioni, in Jacquinii COLLECTANEA relatæ favet Wulfen, ubi de FUCO corniculato ita loquitur. "Veſiculas veras fœmineas hoc in fuco haud detexi; maſcula contra tubercula hemiſphæroidica, apice poro impreſſo umbilicata, et in foliorum lateribus . . . . ſuo occurrere ſolent tempore." (Collect. Tom. 1. p. 359.) F. concatenatus, et F. ſelaginoides, ibid. quos vide. p. 354—356.
Vid. CONFERVAM polymorpham—C. plumoſam—et C. noduloſam. Fl. Scot. p. 990—996, &c.

[3] Cl. Hudſonus in *Florâ ſuâ Anglicâ* maritimas plantas multò plures, quam Linneus toto orbe Terrarum collectas deſcripſit. Vid. Sp. Pl. Edit. 2da Holm.

A ſyſtemate tam accuratè digeſto, tam longè latèque recepto vel minimùm deflectere, ſuſpicionem temeritatis et novitatis ſtudii fortaſſe ſuggerat; in mentem tamen revocare par eſt, quòd principia iſta, quibus ſyſtema ſexuale innititur quoad plantarum genus, de quo nunc agitur; auctori ipſo lauditiſſimo haud extra controverſiam poſita eſſe videantur. Facile eſt tamen conjectari tam ex libro Linnei de Generibus Plantarum, quam ex aliis ejuſdem auctoris ſcriptis, quòd doctrinam ſuam de efficaciâ ſexuali ad unamquamque Regni vegetabilis partem extendi voluerit: immò ad plantas ſcilicet de quibus nunc tractetur; quas ob exilitatem partium propagationi inſervientium ſub nomine Cryptogamicarum ſepoſuerat.[a]

Inter varia auctorum opera, quæ Botanices rudimenta tyronibus tradunt, et fontes ſcientiæ aperiunt, nec elaboratum magis nec utilius eſt, quam PHILOSOPHIA BOTANICA: opus Viri nunquam ſatis laudandi, quod non ſolùm lucidiſſimo ordine conſtructum hujuſce ſcientiæ meritò habetur baſis et fundamen; ſed NUMINIS OPTIMI MAXIMI Sapientiam ante oculos manifeſtè profert et mirificè illuſtrat. Utcunque breve eſt hoc opus et ſuccinctum, ab illo tamen quaſi fonte et origine enata ſunt varia opuſcula, et utilitate ſummâ et ſcientiâ repleta, inter AMŒNITATES ACADEMICAS ejuſdem auctoris evulgata. Horum unum præſertim principia iſta plenè dilucidèque expedit, è quibus pendet de plantarum ſexibus doctrina.[b] In hoc etiam quamplurima proferuntur exempla, quæ Naturæ Providentiam arguunt, quâ multiplices ſuæ Familiæ proteguntur: quorum quidem, vix præclariùs occurrit quàm quod obſervari liceat in Œconomiâ plantarum aquis altè ſubmerſarum. Harum quædam præfinito flores ſuos aperiendi, nequicquam autem alio, tempore, ſeſe ſuper aquas, ut farina per aerem liberè volitans deſtinatam ſuam obtineat ſedem, emergentes oſtendunt, denuòque ſubmerguntur. Si plantis aquas leniter-fluentes habitantibus tanta Providentiæ, ut genus ſuum propagent, adhibeatur Cura; ſi porrò communi quâdam et immutabili lege ut exiſtimandum eſt, agat Natura:[4] operis haud exigui eſſe conſtabit, iſtarum plantarum, quæ, imo ſub oceano permanentèr et funditùs infixæ, nihilominus incunabula generationi ſuæ maximè idonea et amica inveniunt, propagandi rationem inveſtigare.

In hâc enim inveſtigatione mutuus vegetabilium inter ſe ſimilitudinis nexus, haud ampliùs præmonſtrat iter. Maritimâ quâvis plantâ obitèr inſpectâ, nequaquam invenienda eſt præclara illa inter quaſdem animalium et vegetabilium partes cognatio; inter terreſtrium ſcilicet plantarum radicum fibras, et lactea animalium vaſa. Fucorum etenim radices, non ſolùm vaſis ullis abſorbentibus ſuccum coquere et diſtribuere, nullibi aſpicimus, verùm etiam ob duritiem ſuam et texturam coriaceam, ad nihil prorſùs niſi ad firmandam ſibi inter fluctus ſtationem, videntur adaptatæ: læviſſimis enim lapillis aliiſque corporibus ſuccum nutritium omninò denegantibus, hærent affixæ. Fuci equidem de quibus agitur, ſi vel radicum, vel aliarum partium ſtructuram contemplemur, vaſorum, quibus ſuccus propellitur, ſeriem habere nullam videntur. Horum autem vices ſupplent innumera quaſi plantarum cuti inter-

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[a] Claſſis Cryptogamia.

[b] Sponſalia Plantarum.

[4] “Omnis ſpecies Vegetabilium flore et fructu inſtruitur; etiam, ubi viſus eoſdem non aſſequitur.” Philoſoph. Bot. Sect. 139.

“*Muſcorum* ſemina *Nos*.”

“*Fucorum* flores obſervavit *Reaumur*. &c.” Ibid.

“Flos omnis inſtruitur Antheris et Stigmatibus.” Ibid. Sect. 140. et ſequent.

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ſperſa ſpiramenta vel pori. Ad examen hoc facilè vocatur; ſiccata enim hujuſce generis planta ſi in aquâ tota immergatur, ad priſtinam redibit formam et ſtatum; ſi verò pars tantùm immittatur, reliqua manebit arida prorsùs et marcida.—Hinc liquidò patebit, fucis hiſce nulla eſſe vaſa vel canales quibus per totam, ut plerumquè fit, plantam ſuccus diſtribuatur.

Ut veritatem faciliùs aſſequamur, conjecturas inclyti cujuſdam philoſophi de plantarum harum floreſcentiâ ad examen revocare fas ſit; his enim fidem dederunt quidam recentiores, et ad firmandam ſexûs plantarum doctrinam, et methodum inde Linneanam, hæc celebris viri detecta, ut putantur, adduxerunt. Reaumurius, qui hìc loci deſignatur, ſibi viſus eſt in Quercu marina,[c] atque in Fuco ſerrato, et flores et ſemina detexiſſe; flores quidèm frondis ſuperficiem ſine ullo diſcrimine occupantes: unumquemque florem deſcribit ut faſciculum filamentorum capillarium, quorum longiſſimum, lineam haud æquabat: ſummâ verò diligentiâ ſcrutatus, ſe libens confitetur nec faſtigia filamentis his, nec capita cernere poſſe; quæ tamen, ſi filamenta, vera eſſent ſtamina, antheris ornari certè deberent. Hunc nodum dirimere aggreſſus, veriſimillimum eſſe hæc capita, quamprimùm ſe protrudebant filamenta, decidiſſe auſus eſt affirmare: et porrò flores tantùm illos, qui extremas occupant frondes, inſtrumenta eſſe, quibus ſeminiferi fucorum apices promoveantur. Foramen etiam ex quo ſe trudunt filamenta, calycem eſſe ducit. In quibuſdam ſpeciebus fructificationem affirmat ſummis frondibus ineſſe turgidulis et paulùm diſtenſis, dum flores, ſic enim has partes reputari nonnullis placuit, omninò latebant. In aliis contrà, hæ poſtremæ partes ſine ſuperioribus videndæ erant. In Fucis ſcilicet canaliculato, et nodoſo, globuli carpomorphi ſeſe exhibebant, ſine ullis florum filamentis: hi igitur, ait Reaumurius, floreſcendi tempore nunquàm oculis ſubjiciebantur. Fuci palmati contrà ſuperficies, filorum iſtorum, vel ut ſibi videtur florum, faſciculis obtecta erat: nihil autem vel ſeminibus vel capſulis ſimile attentiſſimâ inſpectione cernendum erat.

A Baſtero et Gmelino dudum obſervatum fuit Reaumurii hypotheſin reprehenſioni quodammodo obnoxiam eſſe.

Imprimis. Quòd filamenta capillaria ſemper antheris vel apicibus deſtituta, nunquàm pro floribus haberi poſſint.

Secundò. Quòd, in quibuſdam fucorum ſpeciebus, frondis ſuperficie, integrâ prorsùs et ſine ullis filamentis exiſtente, granulis verò nidulantibus cumulatè inſtructâ, in aliis contrà nulla ullibi ſeminum præ ſe ferente, florum autem, ut voluit, faſciculis coopertâ—hanc potiùs quàm Reaumurii opinionem ſequeremur oporteat; nimirum, fucorum partes ſupradeſcriptas nullo inter ſe ſyſtematis vinculo connecti, unâ nequaquam ab alterâ pendente.[5]

Quod autem pleniùs hoc et meliùs evincit, Reaumurio vix ignotum, id pro certo ſtatuamus; ſcilicet iſta filamenta floreſcentiæ naturâ et ratione tam longè abeſſe, ut in ſuperficie plantæ enaſcentis, teneræ et ad integram ſuam formam nondùm perventæ videantur. Apparent etiam haud obſcuriùs in fron-

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[c] Fuco veſiculoſo.

[5] Nec porrò ſupervacaneum eſt obſervare, quod Linneus, in operis ſui Genera Plantarum denominati editionibus ſub ſuâ ipſius inſpectione prolatis, antequam Baſterus Reaumurii opinionibus ſe oppoſuerat, ſe parùm credere Reaumurii de maſculis floribus dogmatibus oſtenderat, ſignum dubitationis ſibi uſitatiſſimum definitioni ejus ſubjiciendo.

dis

dis ſuperficie, dum faſtigia ejuſdem cum ſuis pericarpiis jam ſeneſcere cœperint et marceſcere; et in hoc toto temporis intervallo nullam quamcunque quæ cernitur, mutationem ſubeunt. Quandoquidem igitur filamenta hæc illis carent partibus, quæ flori ipſi eſſentiales ſunt, quandoquidem nullæ cum aliis plantis ſimilitudinis nexu ſociantur; ad uſum quemnam alium plantarum harum ſtructuræ convenientem deſignata fuiſſe conſtat. Experimento nupèr deſcripto, ea ductus eſſe ſecretorii, vel vaſa ſuccum nutritium frondi tranſmittentia, cenſenda ſunt. Hâc quidem ratione compenſetur iſtius nutrimenti deſiderium, quod terreſtres plantæ radicibus ſuis poroſis è ſolo quo fixæ permanent, nunquàm non derivant: maritimarum intereà radicibus, fluctuum violentiæ, ne jactentur plantæ, ſeſe ſolùm opponentibus.

Hinc apparet Providentis Naturæ Sapientia, quæ unicuique generi partes ſuas et ſitus ſtatuit vegetationi aptiſſimos. Dum in ſeminibus plantarum terreſtrium, formæ magnitudinis et ſitus diverſitatem contemplamur; non poſſumus non reſpicere ſimilitudinem organorum propagationi inſervientium, quoad formam, ſitum, et magnitudinem, plantas maritimas pervadentem. In fucis pleriſque, ſemina aut capſulæ in frondium ſubſtantiâ inſeruntur. Et in quibuſdam horum, ſtructuræ potiùs filiformis; et in confervis plurimis, aut diſtenſis plerumquè pinnularum faſtigiis;[6] aut ramuſculorum veſiculis axillaribus continentur.[7]

Quod igitur grana carpomorpha, quoad ſitum, habitum, et originem reſpicit, confervas non multùm a fucis diſtare affirmetur.

In uno eodemque ſpecimine ſæpe cernantur corpuſcula hæc granulata frondis dilatatæ parti ſimul conglomerata; dum in aliis ramulis, nebulæ quædam leviuſculæ ſola ullius cujuſpiam ad maturitatem progreſſûs ſigna produnt præcurſoria. Si floreſcentia ulla fructificationem harum plantarum anteiſſet, in hiſce et talibus ſpeciminibus dudum eam inventam fuiſſe credibile eſt: nihil verò receptæ huic hypotheſi colorem daturum adhùc eſt repertum.

Obſervandum eſt, quòd Reaumurius hæc filamenta capillaria non niſi in paucis, quinque nempe aut ſex fucorum ſpeciebus cernere poſſet. His pauculis tantùm et tam dubiis exemplis, character generis fucorum numeroſiſſimi videtur niti.[8] Nil mirum eſt, quod Linneus huic digniſſimo

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[6] Ut Fucus ſpinoſus—F. obtuſus—F. cartilagineus—F. pinnatifidus.—Conferva polymorpha, &c. &c.

Quid enim differt, ſi in tumidis frondium tantummodò apicibus, ſeu in ramuſculorum globulis, vel pinnulis diſtenſis, nidulantia deprehendantur granula?

[7] Fucus coccineus Hudſoni—Conferva plumoſa—C. noduloſa, &c. Veſiculæ, in quibus hæcce granula ſeminalia conſpicienda ſe præbent, ex identicâ medullâ maternâ et cortice, conflatæ videntur.

[8] "FUCUS * *Reaum.* A. G. 1711. T. 9, 10, 11.
Maſculi flores?
Veſiculæ glabræ cavæ pilis intus adſperſæ.
Feminei flores.
Veſiculæ glabræ, gelatina repletæ, adſperſæ punctis perforatis ſemine fœtis."
Linn. Gen. Pl. Holmiæ. 1764.

"FUCUS. MASC. *Veſiculæ* villis intertextæ.
FEM. *Veſiculæ* adſperſæ granis immerſis apice prominulis."
Hudſon—Lightfoot. &c.

In

niſſimo auctori nimium fidens, ſententiam, quæ honorem dabat methodo ſuæ acciperet ultrò et foveret.'

Cùm hæc contemplemur, clarius fortaſsè patebit, quòd dum harum ſtructuram algarum moliretur Natura, paululùm deflexerit ab uſitatâ ſuâ operandi ratione, et quòd nullis prolatis de floreſcentiâ harum plantarum teſtimoniis, veriſimillimum duceretur in his propagandi modum ſimplicem eſſe et ſibi ipſis vi inſitâ reſtrictum, ab ullo exteriori adjumento nequaquam pendentem, et à principiis quibus ſexuum diſtinctio aſſeritur, prorſùs alienum. Notatu dignum videatur, quòd opinio hæcce Gmelini et Gærtneri auctoritate commendata ſe prodat, quanquam auctorum horum poſtremus hypotheſin ſuam latè nimis et temerè extendiſſe videtur.

Abſurdum eſſet, ut ait Gmelinus ipſe, ſperare, æquè ac difficile proferre granorum iſtorum fucis ſe prodentium primæ formationis explicationem. Semper enim neceſſe eſt a ſpe decidamus, cùm ad primarias rerum cauſas expediendas nos accingamus. Hæc eadem et de vitæ animalium et vegetabilium ubique conſtant. Pudoris eſt æquè ac prudentiæ intra hos limites noſmetipſos ſiſtere.—" Neque plus novi," inquit, " quam quod ejuſmodi obſervationibus edoceor, ſimpliciori methodo voluiſſe hic CREATOREM eundem finem adſequi, voluiſſe nimirum per ſola grana in ſe fœcunda h. e. vi inſita, nec aliena indigente, prædita, fucorum procreationi proſpicere."

Si materiam hanc ſubjectam contemplari velimus fuſiùs explicatam, Gmelini opus curioſiùs evolvendum eſt. Ille enim Naturæ notat progreſſum, quem quidèm hiſce algarum generibus convenire aſfirmat: in quibus plantis pedetentìm deſcendendum eſt ab iſtis, quæ UNISEXUALES,[10] ad illas, quæ prioribus ſimpliciores prorſùs ASEXUALES orientur.

Horum primis[11] perfectiorum fucorum fructificationem tribuit Gærtnerus, quos fidentèr affirmat veris ſeminibus propagari. Sub poſtremis, fucos plurimos, et omnes omninò conſervarum ſpecies annumeravit.

In editione Syſt. Nat. nuperrimè evulgatâ, character fuci genericus auſis melioribus profertur.

" FUCUS—*Globuli* carpomorphi, vel *ſemina* graniformia ſub punctis perforatis latentia." Syſt. Nat. Edit. Gmel.

Specierum verò diſtributiones, quas è Gmelini HISTORIA FUCORUM, Editor deſumſit, dies forſan, tum fructificationes earundem impenſiùs inveſtigandi occaſio, accuratiores reddat. Vid. Not. 13. &c.

[9] Hæc forſan Reamurii hypotheſis auctoritate cl. Baſteri fuerit commendata, citato ab illo opere Comitis Marſiglii celeberrimo (HISTOIRE PHYSIQUE DE LA MER. p. 160.); in quo loco maritimam plantam perfectos flores gerentem ſigillatim deſcribit, Iconem addens partes ejuſdem accuraté referentem. Baſteri verba ita ſe habent. " Quamvis magnus Botanicus RAJUS neget plantas unquam ſub aqua apertos flores gerere, non tamen hoc ſine exemplo eſſe crediderim. Illuſtriſſimus Comes MARSIGLI *plantam* deſcribit et delineat, quæ ab altitudine quadraginta, et ad diſtantiam quingentarum orgyjarum a littore, ad Promontorium *Canailje* dictum, in PROVINCIA, ex mari extracta eſt, quæ apertos et marcidos flores et fructus gerebat. Flores habebant ſex petala, ſex ſtamina antheris ſuis inſtructa. Apex plantæ multos adhuc clauſos habebat flores." Opuſc. Subſeciv. Tom. ſecund. p. 150.

Singularis hæc deſcriptio indagandi in nobis ſtudium excitavit, non ſine quâdam ſuſpicione, an non talis exſtiterit in oceano planta, et nos impulit oblatam tandem occaſionem amplecti Marſiglii tabellam cum doctiſſimo Botanices in Oxonio Profeſſore regio inſpiciendi. Plantam, Aſphodelum fuiſſe nequaquam in dubio verſabatur; et Profeſſor illam Aſphodelum *ramoſum* fidentèr annunciavit; plantam, quam dudum obſervaverat ipſe in maritimis Italiæ oris et in inſulis parvis Europæ auſtralibus, perfrequentem.

[10] Diſtinctio iſta, quæ voce *uniſexualis* facta eſt, inutilis prorſùs eſſe videtur. Hâc voce Adanſonus intelligit vim ſimplicem et efficacem ſibi ipſi relictam in ſeminiferis quorundam vegetabilium partibus, et hìc fucis ut dicuntur veri nominis applicatur, ut ab illis ſecernerentur, qui *aſexuales* nominantur, utpotè, qui ſeminibus omninó carent et per gemmas propagantur.

[11] " In omnibus veri nominis Fucis, ſola habentur organa feminea, intra frondium corticem abſcondita; Maſculorum autem nullum adeſt veſtigium. &c." Gært. de Fruct. p. 32.

Si iſtam hypotheſeos ſuæ partem, quæ hoc plantarum genus tractat, animo velimus comprehendere; neceſſe forſan ſit definitiones, quibus vegetabilium propagationem incluſit Gærtnerus,[12] inſpicere. Vegetationis originem duplici ex fonte derivatam eſſe affirmat. In altero, "Materies vegetabilis ſolis adjuta vitæ viribus, ſecundum inquilinum cujuſlibet plantæ creſcendi ſchema, in novas formas mutatur, atque ſua ſponte adultarum ſtirpium nova producit exempla." In altero, "tenuiores fluidioreſque ejus partes, miniſterio propriorum organorum, a reliqua maſſa ſecernuntur atque ita elaborantur ut ex harum demum congrua miſcela, mutuaque inter ſe actione, novum prorſus emergat corpus organicum, verique in diſtinctis conceptaculis excitentur plantarum fœtus." Hunc poſteriorem naſcendi modum, Fructificationem appellat, quia ſemina hìnc trahunt originem: priorem illum, Gemmificationem, et unicam propagationis proliferam rationem ducit. Hæc principia poſteà ad diverſa cryptogamiæ claſſis genera ab auctore noſtro adaptantur.

[d] "Conſervæ omnes," ait ille, "tam capillares, quam moniliformes, ſexu et ſeminibus in perpetuum deſtitutæ ſunt. Priores, e ſponte ſolutis, necquidquam mutatis articulis ſuis regerminant. . . . Conſervæ autem moniliformes ut corallinoides—et variæ aliæ adhucdum innominatæ, promunt ex juncturis majorum ſuorum articulorum brevia quædam filamenta lateralia, quæ et ipſa ex parvis articulis conflata ſunt, et ex quibus ſolis, earundem propagationis organa, hac ſimplici formantur methodo, ut nunc unicus, nunc duo ſibi proximi, lateralium filorum articuli, per meram ſubſtantiæ ſuæ carnoſæ intumeſcentiam, in unicum globulum ſolidum convertantur, qui poſtea ſponte decidit, et dum ex altera parte ſcopulis agglutinatur, ex altera novum trudit articulum, atque ſic ſenſim in plantam convaleſcit matri ſuæ prorſus ſimilem." Ingens eſt, ait Gærtnerus, horum globulorum cum vero quodam fructu vel ſemine ſimilitudo, quoad duritiem formam et colorem: "his tamen non obſtantibus, quilibet libenter eis inter ſimplices gemmas locum concedet, qui vel internam globulorum rimatus fuerit fabricam, utpote ex mera medulla atque cortice compaginatam; vel qui eorundem imprimis ſpectaverit ortum, quippe qui, ex confluente ſæpius duorum articulorum in unum globulum medulla, excitatus, nonniſi vegetationis, nequaquam vero fœcundationis opus eſſe poteſt."[13]

Quædam in Gærtneri hypotheſin de conſervarum propagatione obſervationes, libellum huncce ad finem producent.

Generis fucorum et conſervarum idonea diſtinctio inter deſiderata adhuc manet: utpote ſine diſcrimine utrumque genus alterius characterem nonnunquam affectare et perſonam induere videtur. Tranſverſa enim ſepta, articuli, et tenuitas fabricæ filiformis obvium conſervis diſtinctionis characterem

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[12] Hic auctor utiliſſimum opus Botanicorum manibus atterendum nuper edidit: in quo non ſolùm plantarum generum diſtinctiones, fructibus et ſeminibus ſuis inſpectis ſtatuit: verumetiam ſcientèr felicitèrque aliorum auctorum obſervationes, quoad formationem, texturam et uſum iſtarum partium, quæ propagationi vegetabilium inſerviunt, illuſtravit. Nonnunquam tamen diſtinctionibus parùm (ut videtur) idoneis verſatur, quæ characteres genericos conturbant et implicatiores reddunt. e. g. FUCUM plumoſum et F. cartilagineum alioſque ſeorsìm ponit, includens eos ſub genere CERAMIO. Probare enim enititur* "quod eorum globuli ex identica matris medulla formentur et propria ſua virtute, per papillulas e vertice ſuo (ut dicit) pullulantes, in novas plantas procreſcere queant . . . dum contra in omni genuino Fuco vera reperiantur ſemina."

* Gært. do Fruct. Introduct. p. 19. [d] Gært. de Fruct. p. 16.

[13] Fucos omnes complanatos ſemine in perpetuum deſtitutos, et per meras gemmas propagari auſus eſt affirmare Gærtnerus. Luculentiſſimum verò habemus documentum, quòd in nonnullis eorum æquè ac in fucis (ut dicuntur) perfectioribus, per ſemina vera locum habeat propagationis ratio. e. g. FUCUS rubens fronde membranaceâ et verè complananâ conſiſtens, haud raròplurima foliola è nervo intermedio, more prolifero protrudit, "ita

ut

rem videntur imponere. Quaſdam tamen conſervarum articulis deſtitutas notant botanici; [†] dum ſucorum nonnullos ſeptis inſtructos, cernimus. Genus ulva tenebras haſce nequicquam diſcutit, quod ſcilicet naturam et diſtinctiones ſuas cum utroque genere participat. ULVA capillaris Cl. Hudſoni veſiculis extremos ſuos ramulos haud rarò inſtructa eſt, in quibus ſemina pyriformia aut capſulæ, colore ſuo haud aliis plantæ partibus diſſimilia, aſpiciantur. Hinc in fucorum genere adſcribi poſſit. ULVA articulata, conſervarum fabricæ apprimè propinqua eſt: dum FUCUS FILUM diaphragmatum ſeriem exhibet, quæ illum ad hoc genus proximum annumerandum deſignant. FUCUS quidem incurvus in ſe videtur diſtinctiones utriuſque generis continere: pinnulæ enim in recenti plantâ oppoſito lumine examinatæ, ſeptorum ſeries frequentèr produnt, quæ in aliis frondis partibus nuſquam videnda ſunt. In foliis FUCI ſiliquoſi inflatis, diaphragmata etiam tactu percipi poſſint.

Complures dudum animadverterunt Naturam à ſimplicioribus plantarum elementis, ad implicatiorem et perfectiorem earundem ſtructuram, arctâ quaſi catenâ pedetentìm progreſſam eſſe. Eandem verò ſententiam accuratiore forſan ingenio ſcriptor[e] aptiſſimè illuſtrat, qui Regni Naturalis primordia vix et ne vix quidem ſecerni notans; non in ſcalam et ſeriem continuata eſſe, ſed in rete cohærere Naturæ opera, affirmat. Ne plantas haſce hoc modulo metiamur, quæ naturalium ordinum primæ[14] et ſimpliciores cenſendæ ſunt: id pro certo ſtatuamus, nempè ut ulvæ, fuci, et conſervæ, in præſenti haud inter ſe certis fixiſque notis decernantur, et ut quibuſdam characteris proprietatibus unicuique convenientibus nonnunquam participant.[*]

Gærtnerus,[f] ullam eſſe conſervarum generi per ſemina propagationem, quæ quidem ſucorum nonnullis quodammodo attribuit, omninò negat: aſſeritque porrò quaſdam harum plantarum ſpecies lateralibus ſolùm filamentis propagari, quæ per intumeſcentiam ſubſtantiæ ſuæ in globulos converſa, et à ramulis ſponte decidentia, fiunt tandem vice ſuâ prolifera, "et dum ex altera parte ſcopulis agglutinantur, ex altera, novum trudunt articulum."[15] Generis tamen iſtius numeroſiſſimi permultæ plantæ proculdubio, quæ globulos minutos copioſè producunt, in quibus (quantulicumque ſint) plurima opaca granula vel ſemina, quibuſdam anni temporibus, aſpiciantur. CONFERVAM ille corallinoidem exemplum hypotheſi ſuæ maximè repugnans, malis avibus ſepoſuit: hæc enim conſerva fabricæ eſt

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ut quilibet illis inter ſimplices gemmas locum concedet," proles in deciduas citò abeuntes. Hæcce foliola minutiſſimis ciliis denſè emarginata evadunt; in omnibus quarum, vices nimirùm capſularum ſuſtinentibus, ſemina quam plurima purpurea oculis armatis mox reperiemus.

FUCI criſpati Hudſoni laciniæ membranaceæ, et ULVA ferè lactucâ tenuiores, veſiculis creberrimis nonnunquam aſperſæ; in quibus inſignis granulorum copia hæret, ratione et formâ plurimùm iis adfinium, quæ in fucis perfectioribus aſpiciuntur. Alii quoque fuci quos Gmelinus (in Hiſt. Fucor.) ſub ordine membranaceorum olìm ſepoſuit; et quos nuperrimè in SYSTEMA NATURÆ introductos vidimus, utpote *prolibus deciduis* omninò germinantes—juſtam dubitandi cauſam ſuppeditant an veris ſeminibus deſtituti ſint. Immo etiam Gmelinus ipſe fuci membranacei et cauleſcentis ſpecimen deſcribit, "fœtum undique ad latera globulis rotundis nigerrimis:" et rem penitùs inveſtigare cupidus, repudiatâ ferè priori ſuâ opinione, candidè poſtulat: "An ergo tractu temporis, an maturitate ad ſummum perducta mutantur penitùs, fiuntque, ut alias, ſeminum fœcundorum receptacula?" Hiſt. Fucor. p. 175. Nota 2da

[†] C. rivularis, C. fæniculacea, &c. Fl. Scot.

[e] Donati.

[14] "Plantæ omnium imperfectiſſimæ Byſſi et Conſervæ, in quibus Natura primordium inſtituiſſe videtur." Gmel. Hiſt. Fucor. p. 35.

[*] ULVAM articulatam cum *fucis* Lightfootii; et CONFERVAM fiſtuloſam Dillenii, t. 6. *f.* 39. (i. e. C. tubuloſam Hudſoni) cum *ulvis* Linnei conjunctam videmus. ULVA confervoides, Sp. Pl. 1632.

[f] Gært. de Fruct. p. 16.

[15] Annon ſuſpicari licet, quod Gærtnerus in opinionem Adanſoni, quoad conſervæ propagationem, temeré nimis inciderit? "On peut dire que dans le Conferva même, qui n' a point de graines, l' articulation qui en tient lieu, eſt analogue aux Embrions monocotulédons, puiſqu' elle vegète *d' abord par une extrémité qui ſert de racine, en s' appliquant à divers corps, et enſuite par l' extrémité opoſée qui forme des tijes.*" Adans. Fam. Plantar. p. 1. pag. 304.

tam ſimplicis ut pellucido tubulo ſimilem ſe exhibeat, liquore tandem coccineo rubentem. Hujuſce plantæ ita ſe habentis, circa articulos (ut ait rectiſſimè Lightfootius) verrucularum ſubfuſcarum congeries rarô admodùm aſpicitur. Hæ verruculæ microſcopio ſubjectæ, atro-purpurea ſemina vel grana conöidea amplecti videbuntur. Si planta in hoc ſtatu albâ circum implicatur chartâ, liquorem ſuum coccineum ſtatim ejiciet, relictâ ſolùm in chartam pellucidâ quâdam cuticulâ, granulis circa articulos exceptis, opacitatem ſuam et ſoliditatem aliis plantæ partibus prorsùs diſſimilem, retinentibus. Quandoquidem igitur hæcce granula ab internâ conſervæ ſubſtantiâ tam latè diſcedunt, veriſimile eſt ea, ex miſcelâ fluidorum vel ſecretione, à quâ ſeminum originem pendere cenſet Gærtnerus, formata eſſe: et nequaquam ex maternâ medullâ, quæ ſola, ut ſtatuit auctor materiam pro gemmis ſuppèditat.[16] Sed ut res paucis abſolvatur, fluidarum partium ſecretione novum corpus organicum,[s] pericarpia ſcilicet aut ſemina generata eſſe. Si igitur ſecundum auctoris hujuſce ratiocinandi modum, granula, quæ in perfectioribus fucis continentur, vera credenda ſunt ſemina; ab exemplo ſupradeſcripto et quamplurimis aliis conſimilibus liquebit, quòd conſervæ etiam modo haud diſpari propagentur.

Hæc probabilior opinio eſt, eò quòd plantarum harum initia minutiſſima ſunt; et quòd ad læviſſimas ſuperficies, fucorum etiam ad pinnulas capillares ſeipſis minimè ampliores, hæ ſolent adhærere. In his tamen nidulum aliquem protecturum ineſſe, ubi granula hæcce ſeminalia decidentia, tutò recipiantur neceſſe eſt et foveantur. Nec animo facile eſt concipere, quomodo ſecundum Gærtneri opinionem propagandi modus ad finem ſuam perduci poſſit; utpote harum conſervarum ramuli nec minus capillares ſunt quam iſtorum ramulorum pinnulæ è quibus enaſcuntur, adeò ut haud veriſimile videatur articulatum conſervæ globulum tam ſubitò ſe tali ſubſtantiæ adjungere, et tenacitate æſtûs maris violentiam perlaturâ adhærere. Dum facilè admittatur hos globulos ‡ à medullâ plantæ formatos eſſe, pro conceſſo ſumendum eſt tamen, illas conſervarum ſpecies, quæ corpuſcula ſeminalia gerunt in globulis ſupradictis, ſummam per totum propagationis modum habere affinitatem cum fucis perfectioribus: et quandoquidem his nulla floreſcentiæ apertiora ſigna edant, veriſimillimum eſt eas etiam fructificationem ſuam, à vi ſimplici ſibi ipſis inſitâ, principiis iſtis quibus opinio de ſexuum diſtinctione pendet prorsùs diversâ, illis tamen ipſis æquipollente, derivare.

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[16] "Quod gemmæ medulla, fit *pars identica* medullæ maternæ; dum contra ſeminis medulla, non poſſit non eſſe noviſſima et a matris ſuæ *diſtinctiſſima.*" Gært. de Fruct. p. 9.

[s] Gært. de Fruct. p. 5.

‡ Hi globuli ortu et formatione ſuâ nonnunquam ad veſiculas tam propè accedunt, ut ſecerni ab his et internoſci vix poſſint. Vid. Not. 7.

E R R A T A.

ENGLISH TRACT.	*Note*	1	*Line*	5.	—— Builliard *read* Bulliard.
		7		13.	—— *read* ſub punctis, &c.
		15		6.	—— un *read* une.
EXEMPL. LAT.	*Pagina*	6	*Linea ult.*		—— fabricæ filiformis *lege* fabricæ capillaris.
	Nota	13	*Linea*	3.	—— complananâ *lege* complanatâ.
FUCI veſic. deſcriptio.				6.	—— ſuperficei *lege* ſuperficiei.

FUCUS veſiculoſus.

CHAR. GEN. FUCUS—*Globuli* carpomorphi, vel *ſemina* graniformia ſub punctis perforatis latentia. *Syſt. Nat. Edit. Gmel.*

FUCUS. fronde plana coſtata integra veſiculoſa: tuberculis ſeminiferis apicibus tumidis, incluſis.

FUCUS. fronde plana dichotoma coſtata integerrima, veſiculis axillaribus geminis: terminalibus tuberculatis. *Linn. Syſt. Nat. Edit. Gmel. p.* 1380.—*Gmel. Hiſt. Fucor. p.* 60.—*Fl. Scot.* 904.

FUCUS veſiculoſus jam naſcens è baſi glutinoſâ ſaxis et conchis firmitèr adnixâ exoritur, folio ſimplici et perexiguo conſiſtens. Matureſcentis pars frondis foliacea æſtûs vi haud rarò obteritur; dum nervus mediam longitudinem percurrens ſtipitem ſolidum et ſubcylindricum plerumquè æmulatur, nudus omninò à baſi ſuâ ſeſquipedalis et ultrà. Frons intereà modo dichotomo multùm pergit augeſcere, ramis numeroſis ſupernè conferta, et veſiculis aeriferis ut fluctibus innataret inſtructa: mox apices ſubſtantiâ tenaci et gelatinoſâ diſtenſi terminantur, dum plurima tubercula interiori eorundem ſuperficei infixa apparent.* Maturâ ætate gelatinoſa ſubſtantia muciflua eſſe incipit, et armato oculo filamentis capillaribus ſine ordine reticulatis implicari videtur. Nunc per exteriorem apicis cutem puncturæ ſeu foramina aliqua perrumpunt; et nunc etiam magis conſpicienda ſunt tubercula, fortaſſe ob gelatinoſi humoris jam in mucum tranſeuntis diſſolutionem. Punctura quævis ſuperiori unius alicujus tuberculi parte ſubtenditur, et proculdubiò tranſitus habeatur per quem ſemina tranſmittantur.

Fuci maturati jam et penè marceſcentis inſpecto apice, capillaria iſta et reticulata filamenta pulvere quodam aſpergi inveniebantur, plantarum farinæ haud abſimili. Ut cauſa hujuſce pleniùs inveſtigaretur, granula in tuberculo incluſa tenui quodam inſtrumento ſub microſcopio cautè ſubmovebantur, cùm unum horum exploſione ſtatim frangebatur, vi elaſticâ pulverulenta corpuſcula diſpergens, iſtorum adinſtar quæ à Lycoperdo dimiſſa ſunt. Extrema objectorum tenuitas facultatem nobis ultra inveſtigandi inviſit: nec dedit hoc experimentum licentiam pro certo aſſerendi atomos hos ſeminibus fuiſſe analogos; utpote quæ granulorum putreſcentiâ et diſſolutione originem ſuam ducere forſan potuiſſent. Nec tamen quod priori favet opinioni tacendum eſt; nempè pulverem à LYCOPERDO boviſta diſploſum, haud ullis calculis ſupputandum, ab acutiſſimi ingenii viro, Lightfootio ſcilicet, iſtius plantæ ſemina eſſe duci. Si igitur minuta iſta granula, tuberculis nidulantia, (quæ in quibuſdam fucorum ſpeciebus admodùm perpauca ſunt) capſula demùm, atomiſque illa ipſa, ſeminalibus repleta, evaderent, ratio forſan magis in propatulo eſſet, cur hæ plantæ tenuiſſimis alteræ alterius marginibus æquè ac duriſſimis læviſſimiſque corporibus accreſcerent.

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* Vid. T. 1. Fig. 3.

Nervus vitæ viribus præcipuè inſtructus eſt; namque ab illo, foliaceâ abruptâ parte, nova frons ſtatim incipit pullulare. Multùm variat hæc ſpecies. Gmelinus rectiſſimè obſervavit characterem ſpecificum conſiſtere in bullis ſuis et in verrucis fructiferis terminalibus: cauſaſque merè accidentales eſſe, cur illa modo inflatam, modo divaricatam, vel alitèr conſpiciendam ſe præbeat.

Color olivaceo-vel-luteo-viret.

BRITISH MUSEUM

FUCUS veſiculoſus.

Bladder Fucus or Sea Oak.

Specific Char. Frond * flat ribbed entire veſicular: with tubercles containing ſeeds, included in diſtended ſummits.

FUCUS. fronde plana dichotoma coſtata integerrima, veſiculis axillaribus geminis: terminalibus tuberculatis. *Linn. Syſt. Nat. Edit. Gmel. p.* 1380.—*Gmel. Hiſt. Fucor. p.* 60.—*Fl. Scot. p.* 904.

This fucus, in its earlieſt ſtate, conſiſts of a ſingle leaf, and grows on the ſurfaces of rocks and ſhells. Its baſe appears like a thin glutinous ſubſtance, ſtrongly adheſive to the body on which it is fixed. In the further ſtages of its growth, the foliaceous part is frequently worn away by the force of the ſurge, and the middle rib or nerve acquires all the appearance of a ſolid ſtem, being entirely bare and nearly cylindrical, for the ſpace of half a foot or more above the baſe. The frond in the mean time continues increaſing in a dichotomous mode of growth, to a conſiderable extent, furniſhed with numerous branches. It has alſo air-bladders for the purpoſe of buoyancy; and at length terminates with diſtended ſummits, containing a tough gelatinous maſs, around which a number of callous globular tubercles are fixed to the interior ſide (as repreſented in the largeſt horizontal ſection),† each of which is furniſhed with many ſeeds. When the plant arrives at maturity, the maſs becomes mucilaginous, and by the help of glaſſes appears to be enveloped with fine capillary veſſels, irregularly reticulated. At this period, ſeveral ſmall punctures or perforations are frequently viſible on the ſurface of the ſummit, and the tubercles now have a more prominent appearance. This latter circumſtance is in ſome meaſure owing to the diſſolved ſtate of the gelatinous ſubſtance. Each puncture is ſubtended by the upper part of its reſpective tubercle, and is no doubt the channel, through which the ſources of propagation are diſperſed.

A ſpecimen of this fucus in its laſt ſtage of maturity and approaching to decay, being examined; the capillary veſſels in the ſummit were found to be aſperſed with a ſubſtance not unlike the farina of a plant. In order to diſcover the cauſe of this appearance, a ſingle tubercle detached from the ſummit, was placed under the microſcope, and cautiouſly preſſed with a fine inſtrument; when one of the minute grains contained within it was ſeen to explode, and with an elaſtic force ſeemed to diſcharge a pulverized ſubſtance, ſomewhat ſimilar to the particles which proceed from a Lycoperdon. The extreme minuteneſs of the objects defeated all attempts to proſecute the experiment. And we are not authorized upon an accidental appearance to aſſert that the particles in queſtion were analogous to ſeeds: ſince they might poſſibly be aſcribed to the decayed and putreſcent ſtate of thoſe granulated bodies. And yet in favour of the former opinion, it may not appear improper to obſerve, that the powder proceeding from the LYCOPERDON boviſta, and which exceeds all calculation, is, according to the late ingenious Mr. Lightfoot, conſidered as the ſeeds of that plant. If then theſe minute grains, which in ſome ſpecies of marine plants are but few in number, ſhould prove at laſt not to be the actual ſeeds, but only pericarps containing the ſeminal atoms; we may be enabled more readily to account for the promiſcuous growth of thoſe plants on the fineſt edges of each other, as well as on the ſmootheſt ſurfaces of hard extraneous bodies.——The central nerve ſeems indued with an active vital principle, from whence, upon any fracture, new leaves ſhoot forth. There are ſeveral varieties of this ſpecies. One of them is repreſented in the figure, to which the CONFERVA fucicola is attached. They have been conſidered by ſome as diſtinct ſpecies, under the trivial names—F. divaricatus, F. inflatus, &c. Gmelin very properly brings them back to one ſpecific character.

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* The original word *Frons* has been frequently introduced in the preceding tract, as we have not an Engliſh one in common uſe, expreſſive of the meaning, which Linneus has affixed to it. We find it explained, in the admirable work which Profeſſor Martyn has publiſhed upon the Language of BOTANY—*as a kind of trunk or ſtem, which has the branch united with the leaf, and frequently with the fructification.* In the tranſlation of the ſpecific characters into Engliſh, the term *Frond* is ſubſtituted under the ſanction of the above-mentioned author.

seeds:

† See T. 1. Fig. 3.

Colour varies from an olive to a muddy ſordid green.

FUCUS ſerratus.

FUCUS. fronde plana dichotoma coſtata ſerrato-dentata, tuberculis ſeminiferis ad apices terminata.

FUCUS. fronde plana dichotoma coſtata ſerrato-dentata, veſiculis terminalibus tuberculoſis. *Linn. Syſt. Nat. Edit. Gmel. p.* 1380.

Alga latifolia major dentata. *Moriſ. Hiſt. p.* 648. *S.* 15. *T.* 9. *F.* 1.—*Gmel. Hiſt. Fucor. p.* 57.—*Fl. Scot. p.* 902.

Hic fucus frondis margine ſerratâ facilè dignoſcatur. Origine ſuâ et creſcendi ratione non multùm à F. veſiculoſo diſtat. Nervus mediam frondem percurrens, ab eâdem cauſâ cauliformis fit, verùm haud iiſdem vitæ viribus, cùm foliaceæ ejus partes abrumpantur, inſtructus. Apices ſolidi ſunt et tenaces, nec ullo modo inflati, ut in F. veſiculoſo; et lanatis iſtis reticulatiſque filamentis carent. Pericarpia, (tubercula ſc') ferè ovata ſunt, et interiori apicis ſuperficiei vix adhærent;[*] matureſcenti tamen plantâ eorum nonnulla minutis perforationibus arctè ſuffixa inveniantur. Hæcce calloſa eſſe videntur, et grana aliqua continere globoſa, numero pauciora, et minùs opaca quàm iſta quæ ſuprà fuerunt deſcripta. In omnibus, hujuſce fuci et veſiculoſi, quæ examini noſtro ſubjiciebantur, ſpeciminibus, medius nervus ſemper in iſtâ parte terminabatur, ubi tubercula emergere obſervata ſunt; ramorum verò infœcundorum ad ſummas extremitates protendebatur. Color primùm olivaceo-flaveſcens ſæpe ſubfuſcatur.

Cùm hæ utræque plantæ ad magnitudinem creſcant haud exiguam, ſatiùs ſit ramorum ſuorum partem tantummodò, quàm diminutam utriuſque figuram integrè referre: cùm tabulæ noſtræ præcipua ſit intentio, propagationis hujuſce generis modum in quam plurimis obtinentem, illuſtrare.

Gmelinus, (in Hiſt. Fucor.) de Fuco ſerrato ita loquitur. "*Veſiculas aeriferas* nullas habet, nullo unquam tempore. . . . . *Tubercula* ſeminalia nunc crebrius ad frondium extremitates congregata ſunt; nunc per omnem earum ſuperficiem nidulantia ſubinde obſervantur, utraque nuda, *abſque veſiculis,* lana repletis." Fucus ceranoides eſt in eodem ferè ſtatu: hos tamen cum *veſiculoſis* conſociatos vidimus.———Fucorum denique ordo *Veſiculoſos* continens, definitione ludit ancipiti, quæ modò ad *tubercula ipſa,* ut in Fuco ſerrato; modò ad *apices tumidos* et *bipartitos,* ut in F. canaliculato; modò ad *veſiculas* propriè ſic dictas, ut in F. veſiculoſo, frondem inflantes, attinet.

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[*] Vid. T. 1. *b.*

FUCUS ſerratus.

Serrated Fucus or Sea Wrack.

Specific Char. FUCUS. frond flat dichotomous ribbed ſerrate-toothed: with tubercles at the ſummits containing ſeeds.

FUCUS. fronde plana dichotoma coſtata ſerrato-dentata, veſiculis terminalibus tuberculoſis. *Linn. Syſt. Nat. Edit. Gmel. p.* 1380.

Alga latifolia major dentata. *Moriſ. Hiſt. p.* 648. *S.* 15. *T.* 9. *F.* 1.—*Fl. Scot. p.* 902.—*Gmel. Hiſt. Fucor. p.* 57.

The ſerratures on the margin of this fucus render it very diſtinct. In its origin and mode of growth, it hardly differs from the F. veſiculoſus. The nerve in the centre of the frond, from the ſame cauſe frequently acquires the ſtem-like form, obſervable in the latter, but does not however appear to poſſeſs its prolific tendency, when the foliaceous part is broken off. The ſummits in their ripened ſtate are tough, ſolid, and not inflated, neither do they contain any woolly ſubſtance. The tubercles or pericarps are nearly of an ovate form, and at firſt ſeem ſcarcely attached to the ſides of the ſummit;* although in maturity ſeveral of them are found cloſely united to minute perforations in the exterior ſurface of the fucus. Theſe veſſels conſiſt of a callous ſubſtance, not much darker than that in which they are imbedded, and contain ſeveral round grains, which are neither ſo opaque, or ſo numerous as thoſe before deſcribed. The middle nerve in this, as well as in the Fucus veſiculoſus, appeared to terminate preciſely at the part where the fructifications commence: but it reached the extremity of the barren ſummits.—The colour varies through ſeveral ſhades of olive and yellowiſh-brown.

As both of the above plants grow to a very extenſive ſize, it was judged better to delineate a part of their reſpective branches, than a reduced figure of each: eſpecially as the deſign of this plate, is merely to illuſtrate the mode of propagation, obſervable in many of this genus.

Gmelin, in his deſcription of this fucus, obſerves, that it is at all times deſtitute of veſicles or air-bladders; and that the tubercles containing the ſeeds are imbedded in the ſurface of the plant, and *not in bladders.*—The Fucus ceranoides is membranaceous, and never has been found with diſtended ſummits.—Yet both theſe, are placed in the order which contains the *veſicular* fucuſes. The character of this diviſion ſeems to reſt on an ambiguous definition, which at one time relates to the *tubercles only,* as in the F. ſerratus—at another time to the *diſtended ſummits,* as in the F. canaliculatus—and again to the *veſicles* or air-bladders, properly ſo called, and which occur in the frond of the F. veſiculoſus.

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* See T. 1. *b.*

FUCUS canaliculatus.

FUCUS. fronde dichotoma integerrima canaliculata lineari: tuberculis ſeminiferis, apicibus tumidis, incluſis.

FUCUS. fronde plana dichotoma integerrima canaliculata lineari, veſiculis tuberculatis bipartitis obtuſis. *Linn. Syſt. Nat. Edit. Gmel. p.* 1381.—*Fl. Scot. p.* 917.—*Gmel. Hiſt. Fucor. p.* 73. *tab.* 1. *A. f.* 2.—*Fl. dan. t.* 214.

Canalis ſeu ſulcus per alterum cujuſque rami latus in longum ductus, hunc fucum deſignat. Frons à duabus ad ſex uncias faſtigiatìm porrigitur, et inſiſtit baſi denſâ et coriaceâ, è quâ ſtipites aliqui ſimul procedunt; horum quiſque ramos in dichotomâ ſerie producit, qui ipſi ſuâ vice ſubdividuntur, et bifidis apicibus haud rarò terminantur. Fructificatio, diſtenſo frondis apice nidulantibus, globoſis et tenacibus abſolvitur tuberculis. In quibuſdam horum ad maturitatem perductis, quiddam puncturæ adinſtar apicis foramini accuratè adaptatum nonnunquam cernendum eſt. Hoc ideò ineſſe videtur, ut ſeminum diſperſio faciliùs reddatur. Unumquodque tuberculum, grana pauca modò oblongo-ovata, modò ovata, colore caſtaneo vel olivaceo, continet. Hic fucus primùm quidem olivaceo-flaveſcens per deſiccationem nigreſcit demùm.

FUCUS canaliculatus.

Furrowed Fucus.

SPECIFIC CHAR. FUCUS. frond dichotomous very entire, channelled, linear: with tubercles containing ſeeds, included in the diſtended ſummits.

FUCUS. fronde plana dichotoma integerrima canaliculata lineari, veſiculis tuberculatis bipartitis obtuſis. *Linn. Syſt. Nat. Edit. Gmel. p.* 1381.—*Fl. Scot. p.* 917.—*Gmel. Hiſt. Fucor. p.* 73. *tab.* 1. *A. f.* 2.—*Fl. dan. t.* 214.

The diſtinguiſhing character of this fucus, is a channel or furrow, paſſing through every branch on one ſide, in a longitudinal direction. The frond is from two to ſix inches in extent, and has a compact coriaceous baſe, from whence ſeveral branches ſuddenly originate; each one producing ſtems, in a dichotomous ſeries, which in their turn alſo are ſubdivided, and frequently terminate with bifid ſummits. The plant has in general a faſtigiate appearance.

The fructification is fixed in the interior part of the ſwollen ſummit, conſiſting of tough elaſtic globular tubercles. In ſome of theſe when perfectly mature, an appearance like a puncture, cloſely fitted to the perforation in the ſurface of the frond, may ſometimes be obſerved, which ſeems deſigned to facilitate the diſperſion of the ſeeds.

Each tubercle contains ſeveral grains, either more or leſs in number. Theſe latter, notwithſtanding their minuteneſs, vary as to their form, which is ſometimes more or leſs ovate. The colour of the grains is a bright cheſnut; and on ſome ſhores, a light olive-green.

The fucus, when freſh from the ſea, has a yellowiſh hue, which afterwards turns to a black.

Fig. 1. Fucus veſiculoſus è conchâ enaſcens, et nervum, mediam longitudinem percurrentem, parte foliaceâ ſuborbatum exhibens.

2. Pars frondis matureſcentis apicibus diſtenſis, naturali magnitudine.

3. Sectiones tranſverſales. Harum una per apicis medium junioris, naturali magnitudine: altera, ætate paulò provectioris, ad augmentum. In hâc conſpiciuntur tuberculi, cortici apicis interiori arctè adhærentes.

4. Apicis maturi abſciſſa de cute portio, perforationem magis auctam exhibens.

5. Tuberculum ſeorſum, naturali magnitudine, et granum ſinapis haud exuperans: idem etiam veluti ſe ſub microſcopio procedat.

6. Pars ejuſdem, granula fuſca præſentans, maximè aucta.

7. Frondis portiuncula penicillos referens, à Reaumurio maſculos flores denominatos.

a. Pars frondis Fuci ſerrati,* naturali magnitudine.

b. Segmentum apicis tranſverſum tubercula ſeminifera exhibens: auctum.

* Lineolæ tranſverſæ in imo ferè ramulo, incuriâ Pictoris leviuſculâ ſunt effectæ.

A. Pars frondis Fuci canaliculati naturali magnitudine.

B. Apicis maturi ſectio tranſverſalis cum tuberculis ſeminiferis—aucta.

C. Tuberculum ſeorſum, tum naturali magnitudine: tum maximè auctum.

D. Semina tuberculo incluſa.

EXPLANATION OF THE FIGURES.

Fig. 1. The Fucus veſiculoſus growing on a ſhell, with the nerve pervading the frond nearly ſtripped of its foliaceous part.

2. Part of the frond in maturity, with diſtended ſummits, in its natural ſize.

3. Tranſverſe ſections. The firſt taken from a ſummit in its premature ſtate, and natural ſize: the latter, from one approaching to maturity, with the tubercles fixed in the interior part.

4. A ſmall part of the ſummit magnified, repreſenting the perforation through which the ſeeds are diſperſed.

5. A tubercle in its natural ſize, and *ſcarcely* larger than a grain of muſtard. The ſame alſo as it appeared when highly magnified.

6. Part of the ſame containing the ſeeds or grains.

7. A ſmall part of the frond magnified, repreſenting the fine hairs, which were conſidered as the male flowers by Reaumur.

a. A branch of the Fucus ſerratus * it its natural ſize.

b. A tranſverſe ſection with the tubercles containing the ſeeds: magnified.

* The ſmall tranſverſe lines on the lower part of the branch, have been added, through a ſlight miſtake of the Colouriſt.

A. Part of the Fucus canaliculatus in its natural ſize.

B. A tranſverſe ſection of a ſummit in maturity, with the tubercular pericarps—magnified.

C. A ſingle tubercle in its natural ſize, and as it appeared when magnified.

D. Part of the tubercle with the ſeeds.

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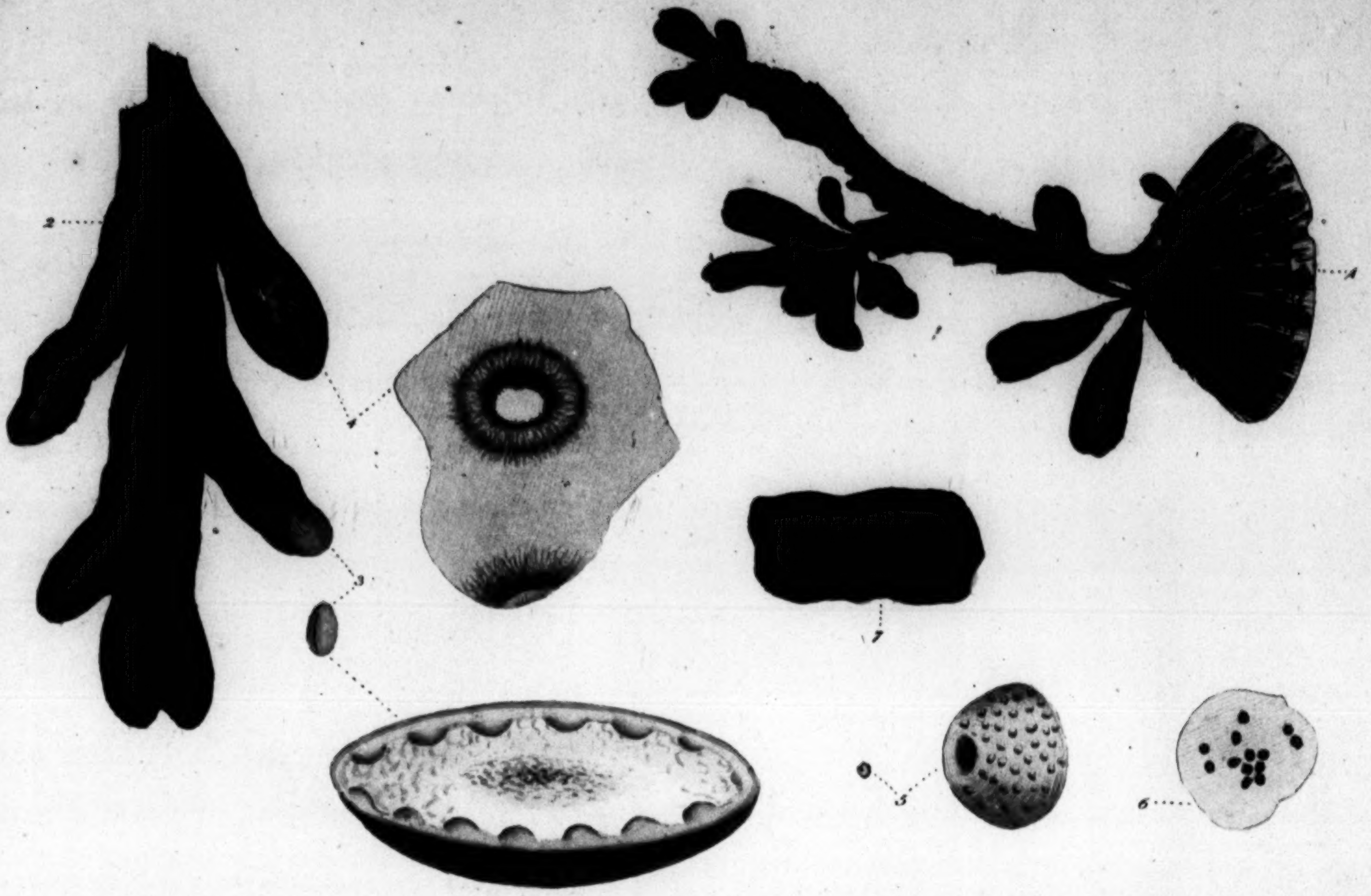
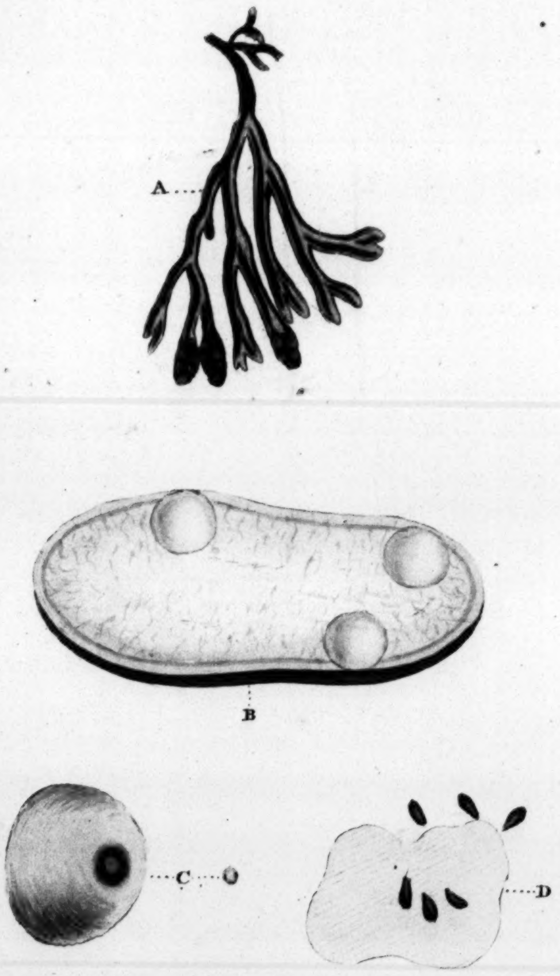
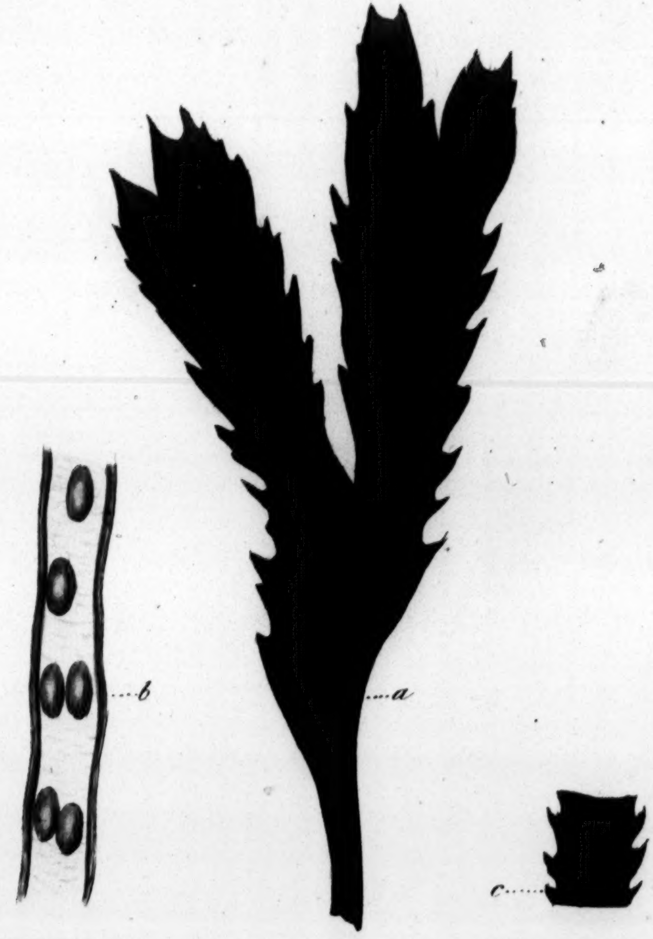


Fucus vesiculosus.



Fucus canaliculatus



Fucus serratus.

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FUCUS purpuraſcens.

FUCUS. fronde filiformi ramoſiſſima, ramulis confertis: pericarpiis ſubgloboſis innatis.

FUCUS. fronde filiformi ramoſiſſima, ramulis confertis ſetaceis fructificationibus globoſis innatis. *Hudſ. Fl. Ang. Edit.* 2da *p.* 589.

Hujuſce fuci frons ramoſiſſima eſt, cujus longitudo à ſex ad decem uncias extenditur. Stipes ad baſin obtuſè terminatur, et radiculas nonnullas inverſas plerumquè demittit, quibus quaſi materiam cui adhæret, conatur firmiùs amplecti. Nec rami, nec folia certo ordine emittuntur. Hæc, modò brevia ſunt et ſubulata, ut in icone referuntur; modò tenuia et filiformia. Planta hæcce à mari nuperè deſumpta ſæpiſſimè olivaceo-viret: cauſis forſan temerè accidentibus purpuraſcit. Sub his varietatibus dignoſcatur tamen globulis innatis, qui foliorum expanſione, ut videtur, formati ſunt.

In nonnullis ſpeciminis noſtri foliis, globuli vix cernendi erant, in aliis, integrè formati, in plurimis, gibboſi et parùm prominentes. Horum tamen omnes ſub microſcopio aucti nihil videbantur niſi ſubdiaphanam et calloſam ſubſtantiam continere. Inſpectis quibuſdam ſpeciminibus, Autumno ineunte; opaci inveniebantur globuli quam plurimis granulis ovalibus fuſcioribus abundantes.

FUCUS purpuraſcens.

Purpliſh Fucus.

Specific Char. FUCUS. frond filiform greatly branched, branches crowded: ſeed-veſſels ſomewhat globular, formed within the ſubſtance of the leaves.

FUCUS. fronde filiformi ramoſiſſima, ramulis confertis ſetaceis fructificationibus globoſis innatis. *Hudſ. Fl. Ang. Edit.* 2da *p.* 589.

The frond of this fucus is greatly branched, and meaſures from ſix to ten inches or more in length. The main ſtem terminates obtuſely at the baſe, from whence it throws out ſeveral inverted radicles, as if for the purpoſe of claſping more firmly the object to which it is fixed. The branches as well as the leaves do not ſeem to grow in any regular order. The latter are ſometimes ſhort and ſubulate, as repreſented in the figure; at other times, they are very ſlender and filiform. The plant, when freſh from the ſea, has in general an olive-green colour: it may probably acquire its purple hue from accidental cauſes. Under theſe variable circumſtances, it may eaſily be diſcovered by the ſmall globular pericarps, which are formed in the very ſubſtance of the leaves themſelves.

In the ſpecimen here repreſented, ſome of theſe globules were ſcarcely apparent; while others were completely formed, and many appeared to be gibbous or prominent. They were found however to contain nothing more than a clear callous ſubſtance. Upon examining ſome ſpecimens of the ſame plant, at a later period; an innumerable quantity of dark coloured oval grains or ſeeds were diſcover-

FUCUS concatenatus.

FUCUS. fronde filiformi ſubdichotoma ramoſiſſima veſiculoſa; veſiculis moniliformibus innatis.

FUCUS. fronde filiformi ramoſiſſima; ramulis dichotomis, veſiculis moniliformibus diſtantibus innatis fol. ſubulatis. *Linn. Syſt. Nat. Edit.* 14. *p.* 968?—*Fl. Scot. p.* 923.

Frons ſeſquipedalis et ultrà è baſi tenaci et incraſſatâ exoritur, nodis tribus vel quatuor nigris ſupernè circumdatâ, unde rami virgultorum more linearium egerminant, foliis tereti-ſubulatis quaquaverſum obſiti. Folia, plantâ matureſcente, pro parte ratâ ramuli evadunt, ramuſculorum ſeriem invicem emiſſuri. Horum ferè omnes, de formâ lineari ſenſim decedentes, in veſiculos oblongos et ſeriatim-concatenatos dilatantur, ſiliquas æmulantes, ab his tamen alieniſſimos; utpote ſubſtantiâ gelatinoſâ ſolummodo conſertos.——Granula plurima undequaque ſub ramorum cute, verrucularum adinſtar congeſta conſpiciuntur. Hæcce microſcopio aucta orbiculatim inſita apparent; minutâ in centro parte pellucidâ; provectâ verò ætate paululum prominentia. Tum ſpatium granulis incluſum diminutam puncturæ formam cepiſſe videbitur. Nonne hoc, ut in nonnullis auſim affirmare, tranſitûs ſit foramen unde grana exiverint?——Adoleſcentiores rami perquam tenues et filiformes nonnunquam evadunt: matureſcentes, et in veſiculos concatenatos abeuntes, ſpinulis perbrevibus et inermibus, extra, ſuffulti: intùs, ex ſolido-ſubcavati aſpiciantur.——Hicce Fuco concatenato Lightfootii videtur eſſe haud abſimilis: at mihi ſcrupulus reſtat, an idem cum illo ſit, quem Linneus ſub *eodem* nomine deſcripſit. Quoad colorem, ex olivaceo-ſubfuſcatur, et demùm nigreſcit.

FUCUS concatenatus.

Necklace Fucus.

Specific Char. FUCUS. frond filiform, nearly dichotomous, much branched veſicular: veſicles necklace-form innate.

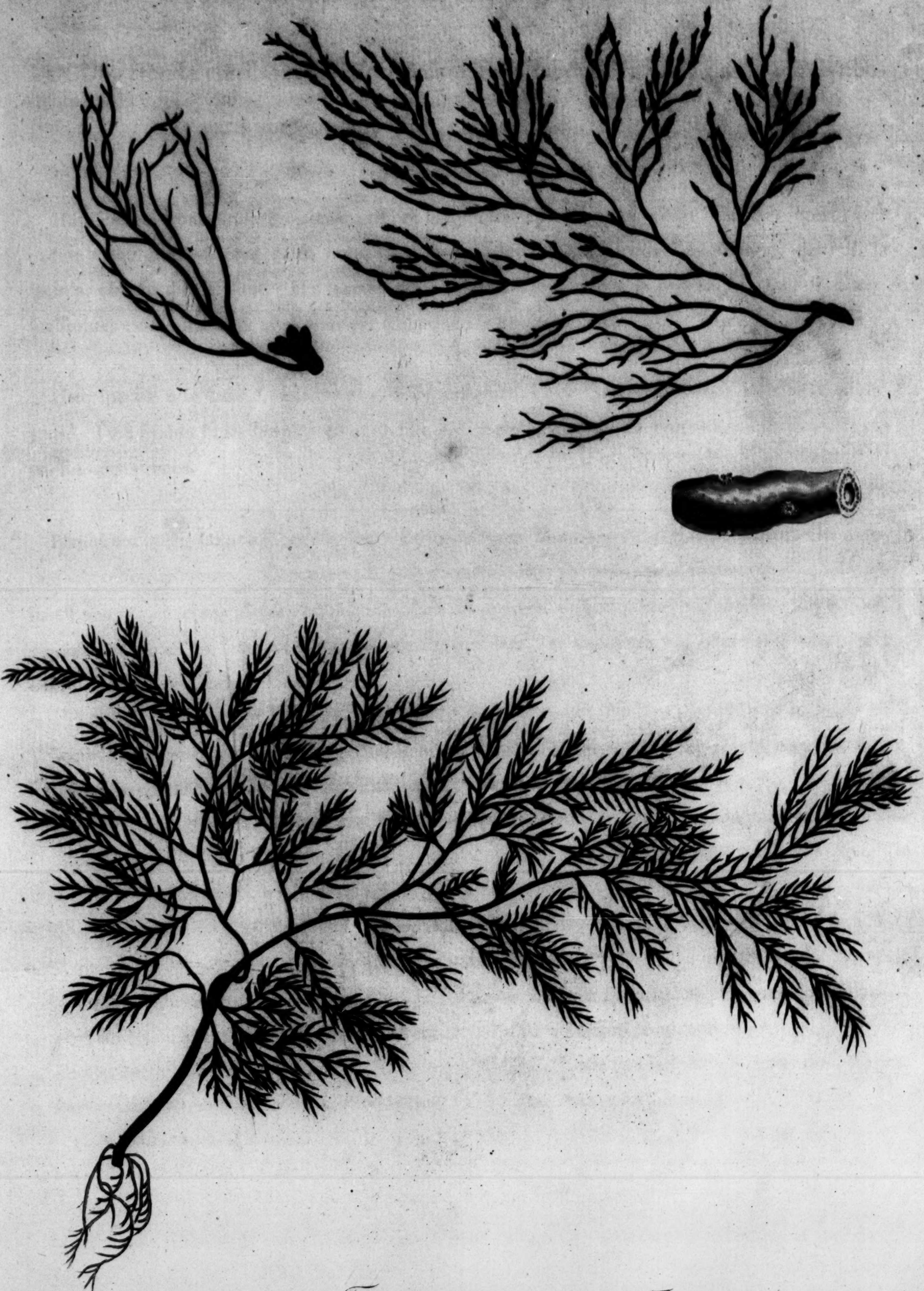
The frond extends to half a foot or more in length from a tough clubbed baſe, which frequently produces three or four hard obtuſe excreſcencies, from the ſides of which the branches originate in the form of linear ſhoots; and theſe throw out in various directions ſhort round ſubulate leaves. The latter, as the plant advances towards maturity, extend in proportion, forming ſecondary branches, which frequently produce others. Theſe branches ſoon loſe their former habit by becoming ſwollen and contracted nearly at equal diſtances, ſo as to form a concatenation of oblong veſicles, having the appearance of pods or ſeed-veſſels. They contain nothing more than a clear gelatinous ſubſtance.——A great number of ſeeds crowded together in ſuch a manner as to reſemble minute warts, appear in every direction beneath the ſurface of the branches; when magnified, they ſeem to be fixed in an annular form; leaving a ſmall portion in the centre ſomewhat tranſparent. In maturity they become rather prominent, while the central ſpace is reduced to a kind of puncture; which probably may be deſigned for the ſame purpoſe as thoſe that have been already noticed in the former fucuſes.——The branches when young are ſometimes very ſlender and filiform: in their mature and diſtended ſtate they are furniſhed with very ſhort and tender ſpinules; and when diſſected are found to be in part hollow.——This fucus and its deſcription ſeem to agree with the F. concatenatus of Lightfoot. Whether it may be the fucus which Linneus has deſcribed under that name, remains a more doubtful circumſtance. The colour of this fucus varies from a darkiſh olive to a black.

EXPL. TAB.

Fig. ſuperior. Fucus, naturali magnitudine. In proximo, pars ramuli veſiculoſi granula exhibens; aucta.

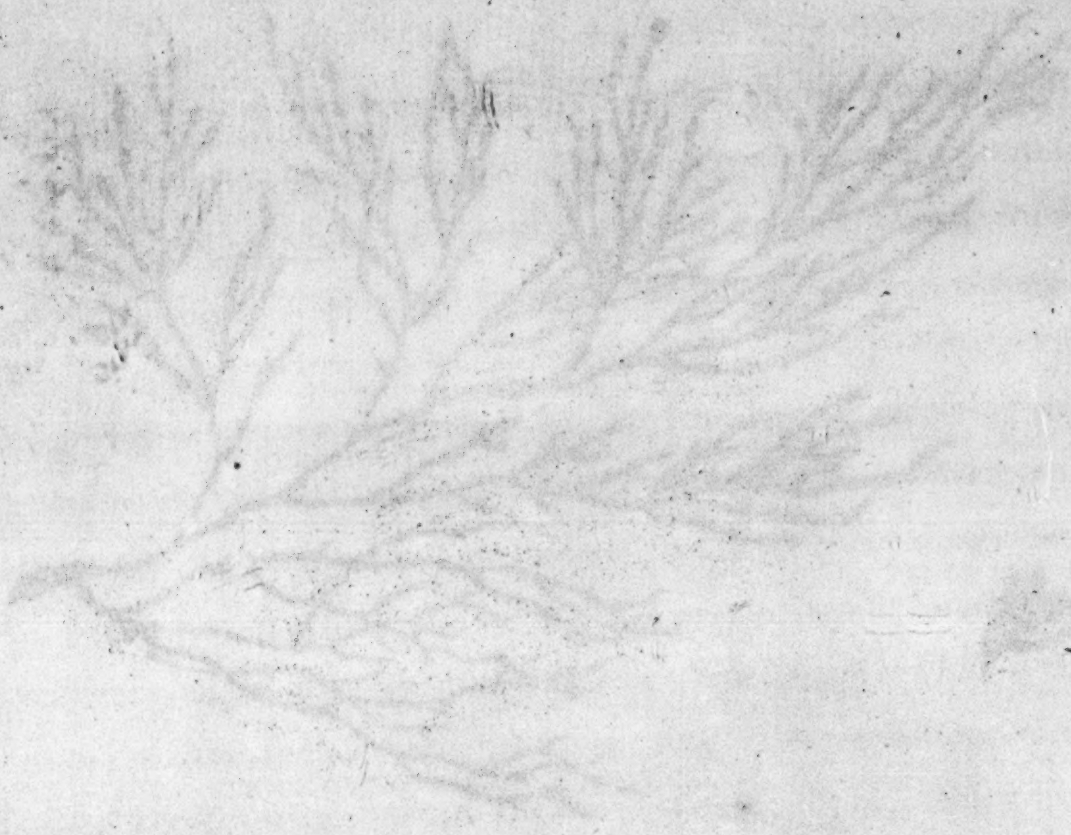
EXPLANATION OF THE FIGURES.

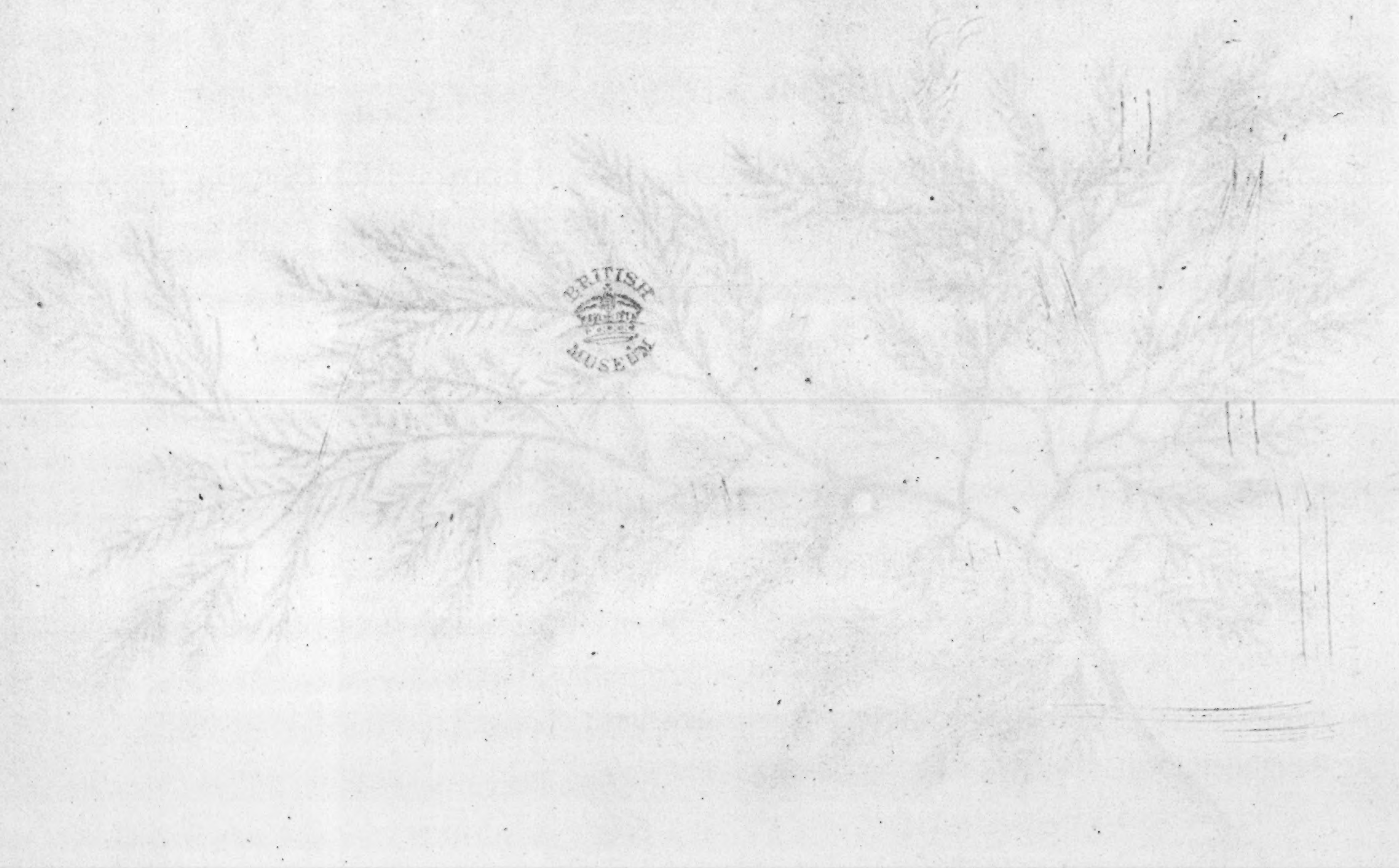
The upper figure repreſents the fucus in its natural ſize. Near it, is a part of a veſicular branch mag-



1 Fucus concatenatus.
a
b

2 Fucus purpurascens.





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FUCUS obtuſus.

FUCUS. fronde filiformi ramoſa duplicato-pinnata, laciniis obtuſis ſuboppoſitis: ſeminibus oblongo-ovatis laciniarum apicibus, inſitis.

FUCUS. fronde cartilaginea filiformi compreſſa ſubduplicato-pinnata, laciniis obovatis apice tuberculatis. *Hudſ. Edit.* 2da *p.* 586.

Hujuſce fuci frons duplicato-pinnata eſt, et longitudine tri-vel-quincuncialis. Stipites incerto ferè ordine à baſi glutinoſâ procedunt, ramis lateralibus conferti, è quibus ramuli enaſcuntur, qui ipſi, in lacinias obtuſas diſſecti ſunt. Hæ laciniæ æquè ac ramuli longitudine ſe pedetentim contrahunt verſus frondis extremitates, et in alterno vel dichotomo ſe trudunt modo.

Hæc ſpecies non raro ſimplicior evadit, ad marginem Fuci Fili, vel ad alias plantas ſe adjungens. Tum frondis ſtipes ſimplex eſt et unicus, ſeſcuncialis, ramuſculos protrudens laterales perpaucos ſub-dichotomos.

Plantarum magis luxuriantium ſtipites, ad craſſitudinem fili emporetici creſcunt, icthyocollæ colorem admodùm referentes. Cuticula verò quæ ramulos veſtit et lacinias, amœniſſimè rubra. Subſtantia eſt tenera: et recens planta vi quâdam elaſticâ eſt prædita. Quanquam magnitudine incertâ eſt, dignoſcatur tamen hic fucus ex obtuſis laciniarum apicibus; et ſæpiſſimè, ex odore fragranti quem emittit, violarum adinſtar.

Semina oblongo-ovata interiori laciniarum medullâ infixa aſpiciantur, quæ, plantâ matureſcente, formâ atque colore ſuo, verruculis minutiſſimis ſunt conſimillima.

EXPL. TAB.

F. 1. Frons naturali magnitudine.

a. Pars ſtipitis, è baſi plantæ junioris, exoriens.

b. Eadem aucta.

c. Pars ramuli extrema cum laciniis, granula congeſta exhibens, magis aucta.

d—e. Laciniarum ſectiones, cum granulis ſubſtantiâ medullari nidulantibus.

f. Granulorum unum de laciniâ decerptum, ſeorſum maximè auctum.

FUCUS obtuſus.

Obtuſe Fucus.

SPECIFIC CHAR. FUCUS. frond filiform branched doubly-pinnate, ſegments obtuſe nearly oppoſite: oblong-ovate grains or ſeeds fixed in the ſummits of the ſegments.

FUCUS. fronde cartilaginea filiformi compreſſa ſubduplicato-pinnata, laciniis obovatis apice tuberculatis. *Hudſ. Edit.* 2da *p.* 586.

The frond of this fucus is doubly-pinnate, and from three to five inches in length. The ſtems proceed from a compact glutinous baſe, and are ſubdivided into lateral branches, which produce a third ſeries, conſiſting of the obtuſe ſegments. The latter, as well as the branchlets on which they grow, become gradually contracted in length, as they approach the ſummit of the frond: and they both ſeem to obſerve rather an alternate or dichotomous mode of growth.

This fucus frequently grows in a more ſimple ſtate upon the edge of the FUCUS FILUM, or on other plants. The frond only conſiſts of a ſmall ſingle ſtem, an inch and half in length, with a few dichotomous lateral ſhoots.

In the more luxuriant plants, the ſtems are as large as common packthread, and reſemble iſinglaſs in colour: but the cuticle, which ſurrounds the ſecondary branches and the ſegments, has a beautiful pink colour. The interior ſubſtance of the plant is tender: and, when the fucus is freſh, it has a kind of elaſticity. It may always be diſtinguiſhed by the obtuſe terminations of the ſegments, and frequently by a powerful perfume which it imparts, not unlike that of violets.

The fructification conſiſts of oblong-ovate grains or ſeeds, fixed in the interior part of the ſegments. In a ſtate of maturity, they appear like minute opaque warts upon the ſurface.

EXPLANATION OF THE FIGURE.

F. 1. The frond in its natural ſize.

a. Part of the ſtem and baſe of a younger plant.

b. The ſame magnified.

c. The end of a branch with the ſegments, conſiderably magnified.

d—e. Parts of the ſegments, with the grains or ſeeds imbedded in the medullary ſubſtance, magnified.

f. A ſingle grain taken from one of the ſegments, greatly magnified.

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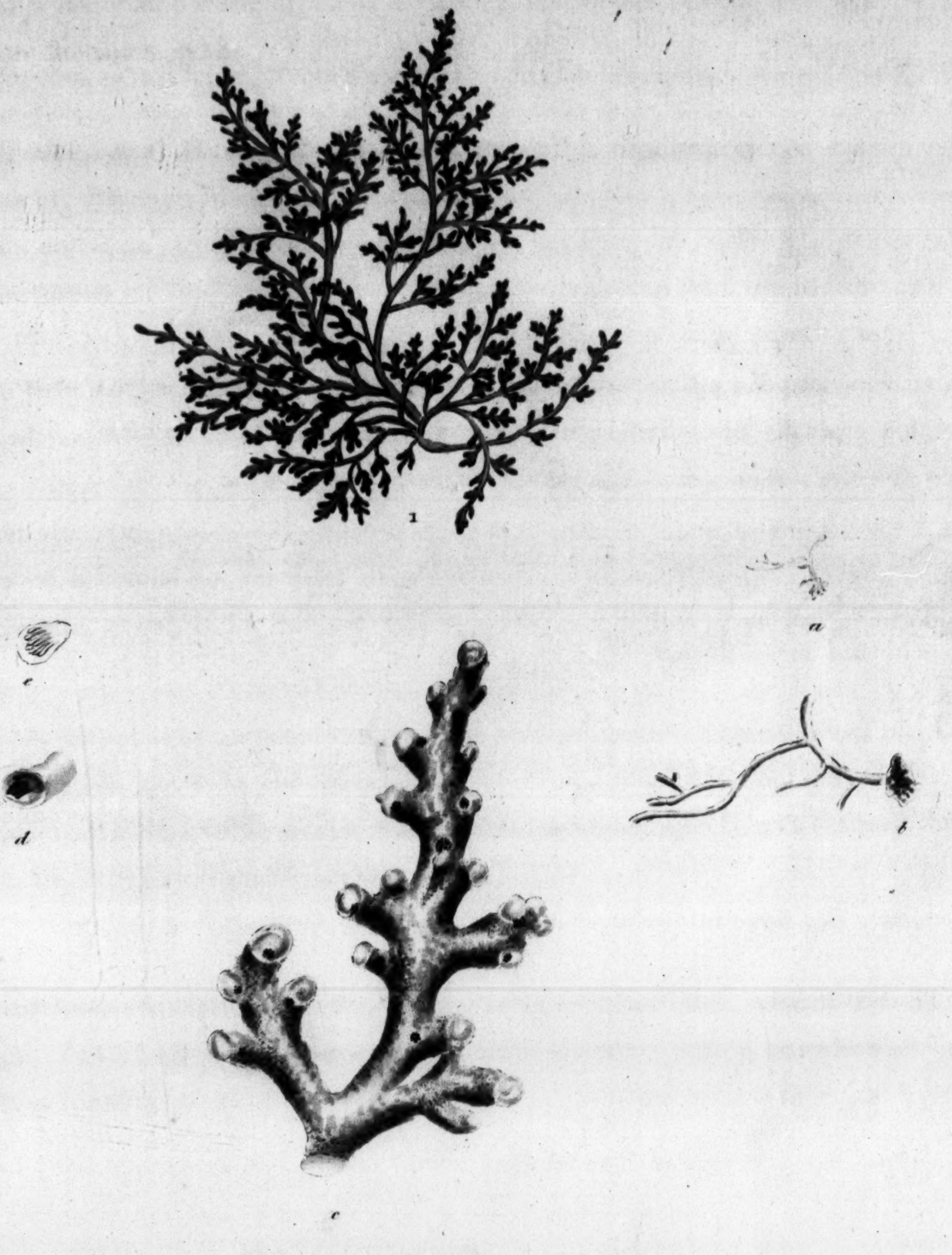

Fucus obtusus
a
b
c
d
e
f

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FUCUS faſtigiatus.

FUCUS. frons dichotomus ramoſiſſimus teres uniformis faſtigiatus. *Sp. Pl. p.* 1631. *Edit.* 2da—*Gmel. Hiſt. Fucor. p.* 106.

Fucus faſtigiatus haud rarò nonnullis è radiculis ut plurimùm implicatis exoritur, qui, ſtipites ad longitudinem trium unciarum omninò ſimplices, vel apice obtuſo bifidos producunt. Tum autem horum aliqui in ramos multiplices dichotomos, longitudine æquales et verè faſtigiatos aſſurgunt. Frondis maturioris ſtipes ramorum pondere depreſſus à radiculis tenuioribus perſæpe divellitur. Frons nonnunquam more ſtolonifero evadit.

Fuci hujuſce ſpecimen quod Herbario Linneano aſſervatur, ob ſiccitatem tam contractum videmus, ut ſpecies ab hâc diverſa exiſtimaretur; ſed cum aliis ipſiſſimæ plantæ ſpeciminibus accuratè collatum, Herbarii doctiſſimo poſſeſſori videbatur, à fuco jam deſcripto, maritimas Angliæ oras habitante, nequaquam differre.

Cl. Wulfen, in Jacquinii Collectan. * minutiſſimi fuci iconem protulit, qui ſub eodem triviali nomine optimè deſcribitur. "Supra cancrorum teſtas, conchas, aliorumque fucorum ſtipites. Exilem," inquit, "et reſpecto Oederiani † gigantis pygmæum exhibeo." Suſpicatur idem Auctor hanc diſparitatem à diſpari plantarum ætate exoriri. Huic autem objiciendum eſt, quòd tenerrimi ſtipites Fuci faſtigiati, antequam vel dichotomi eſſe incipiant, magnitudine illos multùm exſuperant, quos Ipſe, integrè faſtigiatos delineavit, et qui, in hoc ſtatu verè filiformes eſſe, et altitudine parum unciam unam excedere videntur.

Apices, maturâ in ætate depreſſi et paululum dehiſcentes, ſubſtantiam medullarem, in mucum maximâ ex parte abeuntem, effundunt. Per id tempus granula plurima eburnea ovata in filamentis laneis nidulantia, nonnunquam aſpiciantur.—An ſemina ?—non verò "*ſub punctis perforatis latentia,*" apparent. ‡

In uno eodemque ſpecimine variat ſegmentis prælongis § et acutioribus, unde nominis error manet Fucus furcellatus. At Cl. Smithius, in re botanicâ judiciiſque plurimum pollens, inter hanc varietatem, et *furcellatum* Linnei hiſce oris de facie prorsùs ignotum, agnoſcere voluit differentiam ſpecificam.

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* Tom. 3. T. 14. *f.* 2. † Fl. dan. Tab. 393, quæ proculdubio noſtratem refert. ‡ Vid. Fucor. Char. gen. § Hanc varietatem primus obſervavit Cl. Woodvardius, qui in plantis inveſtigandis non exiguam navavit operam.

FUCUS faſtigiatus.

Faſtigiated Fucus.

SPECIFIC CHAR. FUCUS. frond dichotomous greatly-branched round uniform faſtigiate. *Sp. Pl. p.* 1631. *Edit.* 2da—*Gmel. Hiſt. Fucor. p.* 106.

This fucus frequently grows from ſeveral implicated radicles, which produce ſmall clubbed ſtems. Theſe at firſt are ſimple, and attain the length of three inches or more, before they ſhow much tendency to a dichotomous mode of growth; when ſome of them ſtrike out into numerous branches, which, being nearly of an equal ſize and length, give the fucus its faſtigiate appearance. In this ſtate, the ſtem becomes too ponderous for the radicles, and is generally found ſeparated from them. The frond ſometimes produces ſtoloniferous runners.

The ſpecimen of this fucus preſerved in the Linnean HERBARIUM is ſo much reduced in its dried ſtate, that it might be miſtaken for a diſtinct ſpecies; but upon comparing it carefully with other ſpecimens of the ſame plant, in the preſence of the learned and ingenious Poſſeſſor of the HERBARIUM, it appeared evidently not to differ from the one found on our Engliſh coaſts, and deſcribed above.

Wulfen, in the third Volume of Jacquin's COLLECTANEA,* has given a figure of a very minute fucus, which is remarkably well characterized under the ſame trivial name. He obſerves, that it is found growing on ſhells, fucuſes, and other bodies; and that it is a mere pigmy in point of ſize, with reſpect to Œder's plant, † which is evidently the ſame as our own. This author ſeems to ſuſpect that the difference may depend upon the different ages of the two plants. To this it muſt be objected, that the young ſtems of the FUCUS faſtigiatus, even before they become branched, greatly exceed in ſize and extent thoſe which Wulfen has delineated in their completely-faſtigiate character; and which in this ſtate ſeem to be truly filiform, and ſcarcely exceed an inch and quarter in height.

In maturity the medullary ſubſtance of this fucus becomes mucilaginous, and eſcapes from the ſummits, which burſt open in a longitudinal direction. At this period, an innumerable quantity of white ovate grains may ſometimes be diſcovered enveloped in a kind of woolly ſubſtance. If theſe grains are conſidered as the ſeeds, they do not appear connected *with any perforation* ‡ *in the ſummit:* and which in this inſtance would be uſeleſs.

This fucus has frequently been found to vary in the ſame ſpecimen with long acuminated ſegments; § from which circumſtance it has been confounded with the F. furcellatus of Linneus: but in the opinion of Dr. Smith, which may be conſidered as deciſive, the latter remains a diſtinct ſpecies, and at preſent an entire ſtranger to the Engliſh ſhores.

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* T. 14. *f.* 2. † Fl. dan. T. 393. ‡ See the GENERIC CHARACTER of the Fucus. § This variety appears to have been firſt obſerved by Mr. Woodward, to whoſe labours the botanical World is much indebted.

CONFERVA fucicola.

CONFERVA. filamentis ſimpliciſſimis capillaribus geniculatis breviſſimis confertis.

Hæc minuta admodum conferva eſt, et nunquam deſcripta fuiſſe videtur. Verno tempore, Fuco veſiculoſo vel nodoſo ceſpitoſa adnaſcitur. Non amat ſicut aliæ maritimæ plantæ, ullis oblatis corporibus promiſcuè ſe adjungere: nunquam enim per ſpatium trium menſium, ſaxis ſubmarinis, conchis aliiſque rejectamentis accreſcens inveniebatur. Numeroſis conſtat filamentis vix ad unciæ dimidium longitudine extenſis, ad baſin densè implexis, et ab illinc quaquaversùm ferè divergentibus. Filamenta, ſimplicia, tubuloſa, apicibus obtuſa, et tranſverſa ſepta dilucidè exhibentia: ſeparatim pallide-flaveſcentia vel ſubdiaphana apparent: conjunctim ſubfuſciorem et luteo-flaveſcentem referunt colorem. Fructificatio adhuc eſt incognita.

E X P L. T A B.

Fig. 2. Conferva fucicola Fuco veſiculoſo accreſcens.

a. Filamenta plurimùm aucta in quibus diaphragmata apparent.

CONFERVA fucicola.

Specific Char. CONFERVA. filaments moſt ſimple, capillary jointed very ſhort crowded together.

This is a very minute conferva, and does not appear to have been deſcribed. It is found in the Spring, growing in thick tufts upon the Fucus veſiculoſus or nodoſus. It does not ſeem to poſſeſs that indifference, with reſpect to the place of its growth, which marine plants generally do: for in the courſe of two or three months it was never diſcovered on rocks, ſhells, or other extraneous bodies. It conſiſts of numerous filaments ſcarcely half an inch in length, cloſely matted together at the baſe, from whence they diverge ſometimes in a circular direction.

The filaments appear ſimple and unbranched. They are tubulous, and have numerous diaphragms: their termination is obtuſe. When viewed ſeparately they are almoſt tranſparent, or have a light yellow tint. In the maſs their colour is deeper, and partakes of a muddy-yellow or brown.

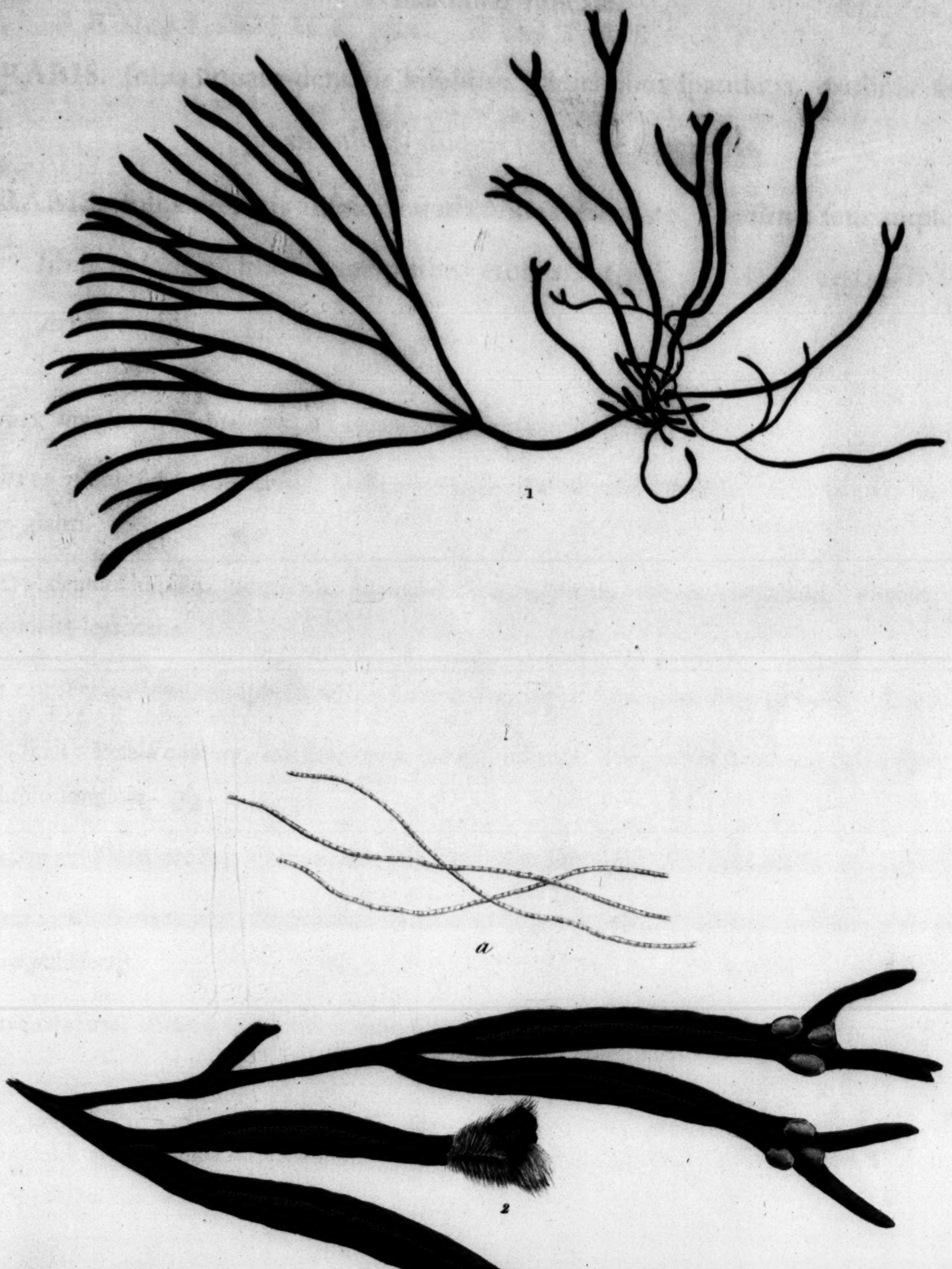
This conferva is found in great abundance under an elevated Cliff near Weymouth, called the *Look-out:* particularly in the Spring Months. The fructification has not yet been diſcovered.

The Fucus obtuſus and many other marine plants may be found near the ſpot above-mentioned.

EXPLANATION OF THE FIGURE.

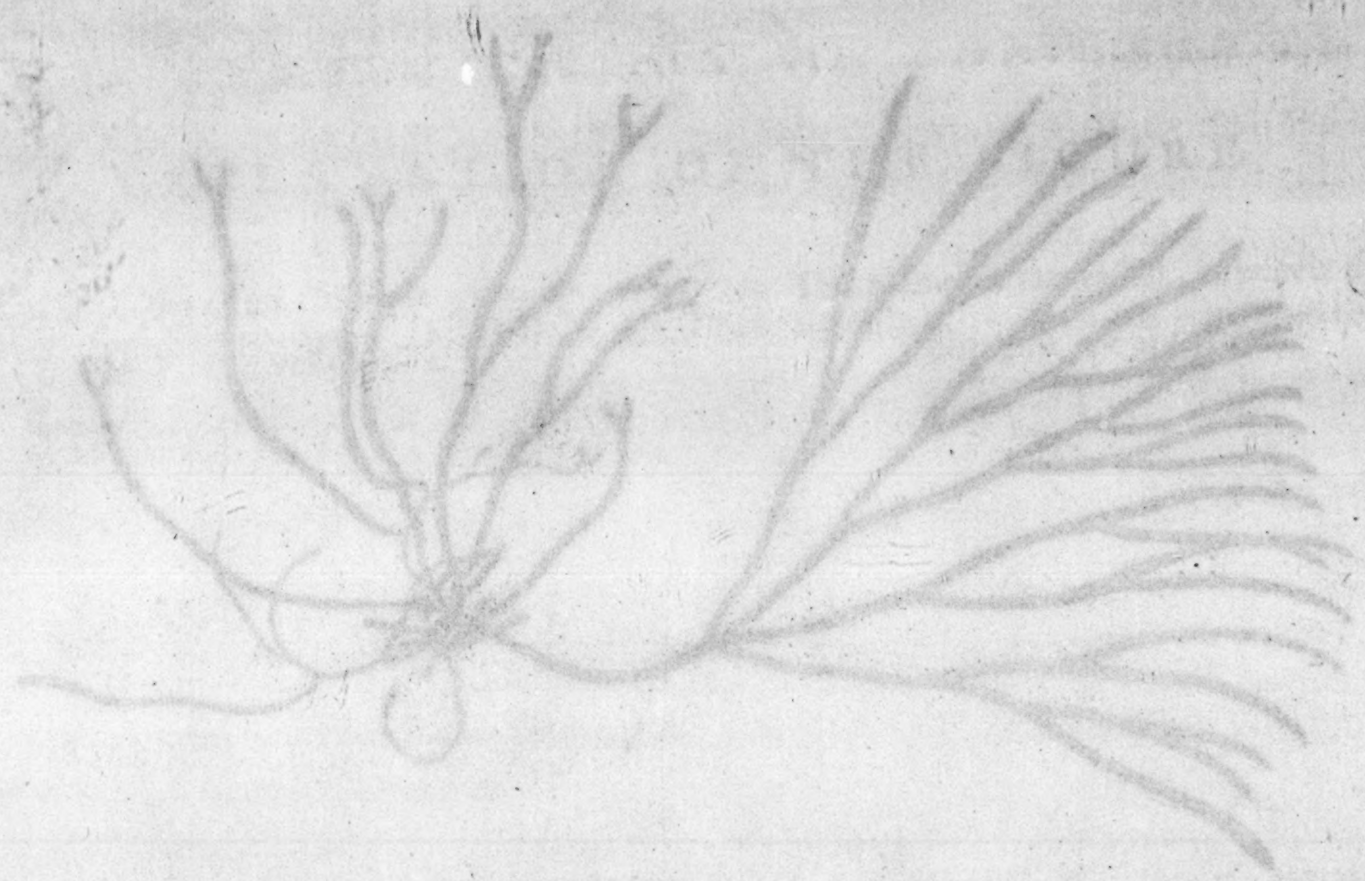
Fig. 2. The Conferva fucicola growing upon the Fucus veſiculoſus.

a. The filaments magnified, in which the diaphragms are apparent.



1 *Fucus fastigiatus.*

2 *Conferva fucicola.*
a



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ARABIS ſtricta.

TETRADYNAMIA Siliquoſa.

Char. Essent. *Glandulæ* melliferæ quatuor, ſingulæ intra calycis foliola, ſquamæ inſtar reflexæ.

ARABIS. foliis ſinuato-dentatis hiſpidis: radicalibus ſpatulatis, caulinis ſemiamplexicaulibus ſiliquis tenuibus ſuberectis.

ARABIS. foliis dentatis hiſpidis: radicalibus ſpatulatis, caulinis ſemiamplexicaulibus oblongis, ſiliquis ancipitibus erectis. *Hudſ. Fl. Angl.* 292.—*With. Bot. Arr.* 702.

Radix ſimplex vel ſubramoſa, ad imum ſæpe fibroſa.

Caules plures ſubramoſi teretes, biunciales uſque ad ſemipedales et ultra: circa baſin hirſuti, ſupernè glabri.

Folia dentata hiſpida. *Radicalia* ſinuato-dentata, ſpatulata, deorſum anguſtata. *Caulina* dentata, ſemiamplexicaulia.

Calyx: Perianthium tetraphyllum, foliolis concavis, ſupernè conniventibus, ad baſin truncatis. *fig.* 1.4.

Corolla: Petala quatuor, integra, apice obtuſa, dilatata, longiorum ſtaminum baſi affixa: calyce duplo longiora. *fig.* 2. 5.

Stamina: *Filamenta* ſex, quorum duo paululùm breviora. *fig.* 6. *Antheræ* flavæ. *fig.* 7.

Pistillum: *Germen* teres, longitudine ſtaminum. *Stylus* nullus. * *Stigma* obtuſum, pilis perbrevibus pubeſcens.

Pericarpium: *Siliqua* tenuis ſeſcuncialis bivalvis ſemina continens. *fig.* 3—et aucta, *fig.* 8.

Glandulas melliferas intra calycis foliola ſcrutatus ſum, ut potui, et quæſivi fruſtra. Neque ſiliquam ad baſin *quadrangularem* eſſe, affirmare auſim.

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* Vid. Linn. Gen. Pl.

ARABIS ſtricta.

TETRADYNAMIA Siliquoſa.

ESSENT. CHAR. Four melliferous *glands*: one within each leaf of the calyx reſembling a reflected ſcale.

SPEC. CHAR. Leaves ſinuate-toothed hiſpid: thoſe near the root ſomewhat ſpatulate: the cauline leaves half-embracing the ſtem. Pods ſlender, nearly upright.

ARABIS. foliis dentatis hiſpidis: radicalibus ſpatulatis, caulinis ſemiamplexicaulibus oblongis ſiliquis ancipitibus erectis. *Hudſ. Fl. Angl.* 292.—*With. Bot. Arr.* 702.

ROOT ſimple, or ſomewhat branched, fibrous at the end.

STALKS ſeveral, ſomewhat branched, round, from two to ſix inches and more in height, hirſute near the baſe, ſmooth upwards.

LEAVES toothed, hiſpid: thoſe near the root ſinuate-toothed, ſpatulate, and gradually reduced in breadth towards the baſe: the upper leaves toothed, and half-embracing the ſtem.

CALYX: a Perianth of four leaves concave, connivent at the top; the baſe of each truncate. *fig.* 1.4.

COROLLA of four Petals, entire, dilated, obtuſe at the ſummit, apparently inſerted at the baſe of the longeſt ſtamens: twice the length of the calyx. *fig.* 2. 5.

STAMENS: ſix *filaments*, two of which are in a ſmall degree ſhorter than the others. *fig.* 6. *Anthers* yellow. *fig.* 7.

PISTIL: *Germ* round, the length of the ſtamens. *Style* none.* *Stigma* obtuſe, covered with hairs.

PERICARP: a *Silique* ſlender, two-valved an inch and half in length. *fig.* 3—and magnified. *fig.* 8.

The melliferous Glands I have not yet been able to diſcover. The ſeed veſſels do not appear to be quadrangular.

The Author is obliged to the Hon. Miſs Broderick for an elegant and characteriſtic drawing of the ARABIS ſtricta, which has been ranked among the ſcarce Britiſh plants, and not deſcribed by Linneus. The ſpecimen here repreſented, exceeds in ſize the plant, as it is uſually found on the more acceſſible parts of St. Vincent's Rock: yet as it was brought from thence in its native ſoil, and was perfect in all its parts, no apology, it is preſumed will be neceſſary, for the preference now beſtowed upon it. We ſeem from miſtaken ſynonyms to have adopted as a native plant, one, which probably has never been diſcovered in this Country, and belonging to the ſame *natural claſs* as the ARABIS ſtricta; namely, the CARDAMINE bellidifolia. Ray, in his Synopſis p. 300, deſcribes a plant from St. Vincent's Rock in the following words. "Cardamine pumila Bellidis folio Alpina." And at the ſame time refers to Gerard p. 260, fig. 8, which clearly ſhows it is not the plant in queſtion. The leaves in Gerard's figure being nearly ſeſſile; and the ſtalk, according to that Author, "ſome handful high"—both which circumſtances prove it to be as different as poſſible from the CARDAMINE bellidifolia of Linneus. See *Fl. Lap. edit. cl. Smithii, t.* 9. We frequently find the TURRITIS hirſuta on that part of St. Vincent's Rock to which Ray alludes.

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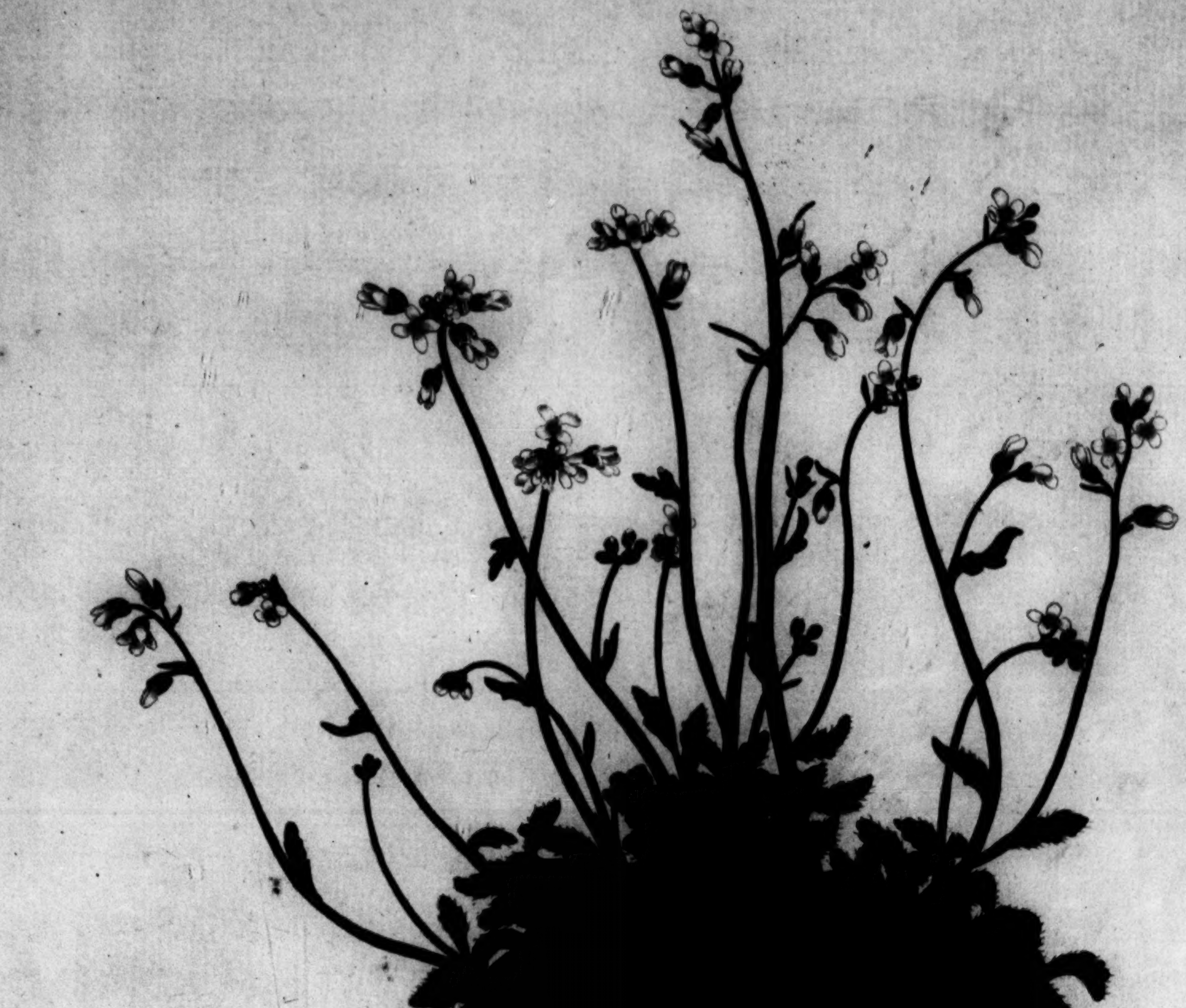
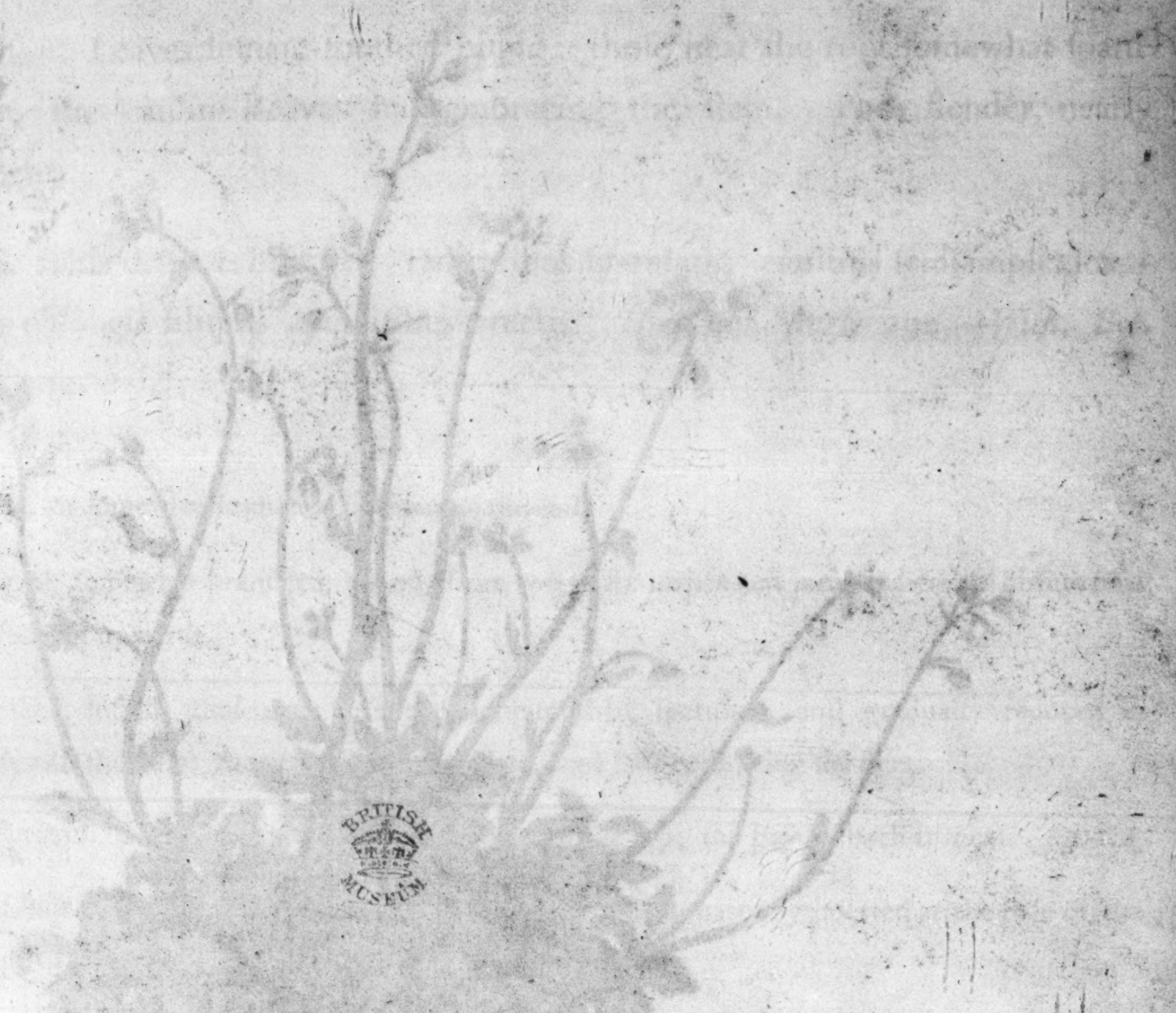
* See Linn. Gen. Pl.



Arabis stricta.



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